EMBODIED KNOWING FOR CLIMATE CHANGE ADAPTATION INTERVENTIONS:

MOVING BEYOND MONITORING AND EVALUATION IN THAI BINH, VIETNAM

by

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STATEMENT OF AUTHENTICATION

I certify that the work in this thesis has not been previously submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that this thesis has been written by me. Any help that I have received in my research and the preparation of this draft itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

ABBREVIATIONS USED

CCA	Climate change adaptation
CCAIs	Climate change adaptation interventions
DARD	Department of Agriculture and Rural Development
DFID	Department for International Development
DONRE	Department of Natural Resources and Environment
GEF	Global Environment Facility
IMHEN	Institute of Meteorology, Hydrology and Climate Change
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and evaluation
MARD	Ministry of Agriculture and Rural Development
MCD	Centre for Marinelife Conservation and Community Development
MONRE	Ministry of Natural Resources and Environment
MOST	Ministry of Science and Technology
MPI	Ministry of Planning and Investment
NGOs	Non-governmental organisations
NTP	National Target Programme
OECD	Organisation for Economic Co-operation and Development
PMU	Panel of the Management Unit
SLA	Sustainable Livelihoods Approach
SPRCC	Support Programme to Respond to Climate Change
STS	Science and Technology Studies
UNDP	United Nations Development Programme
VND	Vietnamese currency (15,000 VND are equivalent to roughly NZ$1)

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THESIS ABSTRACT

Climate change adaptation interventions (CCAIs) are being implemented in a variety of ways. Our current knowing on the effects of CCAIs is mostly based on scientific and rationalist practices that are prone to oversimplification and externally imposed priorities and knowledges about climate change. A number of scholars have already been critiquing these "realist" and neo-colonial approaches, but these critiques do not go far enough. This means we may frequently miss unexpected or localised aspects of adaptations, some of which may be useful beyond the local level. This thesis explores one alternative to our current approaches in order to better know the reality in relation to water-related CCAIs in the specific context of Thai Binh province Vietnam. From this knowing we can create possibilities or illuminate the pathways towards more appropriate climate change adaptation.

For this study I explore three experimental approaches including a postdevelopment perspectives, science and technology studies (STS) and the process of re-subjectification of researchers. The first approach expects to bring a rich description of the effects of developmentalist water-related CCAIs, which enables us in finding alternatives to climate change adaptation. The second approach follows the work of STS scholars in examining the ways we get to know reality, particularly current mainstream monitoring and evaluation (M&E) practices of CCAIs, which are dominated by scientific orientation. By exploring the process of applying these practices, I argue that there are always social and material constructions shaping M&E results, which then in turn form reality. This means that there are always politics and subjectivities present in the interactive process of forming and reforming the new realities which emerge from particular interventions and their monitoring and evaluation. This argument resonates to the third experimental approach by which I come to know and participate in forming new realities in relation to water-related CCAIs in Thai Binh, primarily through critically reflecting on my knowledge and subjectivity as a researcher, government official and citizen of Thai Binh.

Through this journey of experimentation, which draws on both my intellect and my subjectivity, the thesis proposes integrating an embodied approach into current practices of doing M&E and research for climate change adaptation work, particularly at the grassroots

level. Applying an embodied approach, the realities of the effects of water-related CCAIs account for not only local physical and material changes but also the concerns, cares and other mundane sentiments of locals and ourselves as scholars. In addition, our practices always have politics to form particular reality; embodiment can thus be considered as an accessible tool for knowledge makers to propose meaningful and appropriate adaptation towards new climate-adapted worlds.

INTRODUCTION

Introduction

In my role at the Ministry of Natural resources and Environment (MONRE) in Vietnam I worked to implement climate change adaptation interventions (CCAIs) in the area of water for nine years. Through all my time in that role, I wondered about what we really know in our work as researchers and knowledge makers. How do we know if our interventions are working? More importantly does what we do matter for locals on the ground? This thesis is my attempt to answer these questions. It is worthwhile because the problem of "how we know about climate change adaptation" is not just a problem for me but one that all climate scientists, development workers and governmental officials face in Vietnam and in other parts of the world.

I am not the first person from Vietnam to do a PhD that is ultimately about the desire to do climate change adaptation better. Many other Vietnamese scientists and knowledge workers, via PhD projects, have attempted to contribute to knowledge on climate change adaptation in Vietnam. We share similar journeys of going abroad for PhD studies, getting promoted and ultimately implementing what we think we know to better manage climate change adaptation for Vietnam. Many of us work for and with the main climate change knowledge producers and intervention implementing agencies. For example, in a PhD project, Le Thi Hong Phuong (2017), a teacher at a large university, examines the advantages and disadvantages of hierarchical administrative systems. Trinh Thi Thanh Binh (2016), an official working at the Ministry of Agriculture and Rural Development (MARD), studies the limits of climate change adaptation intervention for farmers in the Red River Delta. Nguyen Sy Linh (2017), working at MONRE, analyzes and criticises the limits of CCAIs at provincial levels. Tran Van Son (2016) argues on ineffectiveness of CCAIs for the poor and designed by the poor. Nguyen Huu Tung (2016) examines key actors and factors for unproductive operations of government agencies, in particular coastal communities in central Vietnam. Each of these studies PhDs advanced legitimate, professional and evidence-based critiques of the hierarchical culture in the development and implementation of CCAIs, their effectiveness on the ground, and other related limits and challenges.

Should we be tired yet of merely specifying what the problem is? I wonder. We Vietnamese researchers and knowledge makers somehow already knew about the problems inherent in hierarchical management, for example, even before we embarked on our PhD projects. After all, we work for government agencies, and we might even be contributing to these problems. So why do we keep producing theses that outline in ever increasing detail problems we already know about, without proposing anything really that different? With this study I aim to do something differently, something that is not about revealing or presenting the limits and challenges of current CCAIs but rather finding solutions or at least pointing to new pathways toward more appropriate adaptation. This resonates with what an amazing 16-year-old climate activist, Greta Thunberg, states: “Until you start focusing on what needs to be done rather than what is politically possible, *there is no hope*. [....] And if solutions within the system are so impossible to find, maybe we should change the system itself” (Rigitano, 2018, emphasis added).

This thesis attempts to begin to think through what we might do differently for CCAIs in Vietnam, but also examine how we think about what we know about climate change adaptation more generally. In particular, I have been struggling with the questions, “So now what? What should we do differently for better CCA?” These questions are seemingly not addressed by my colleagues, particularly for CCA in Vietnam. It is worth affirming here that my thesis is not about undermining or criticising all these valuable studies: indeed, I admire these scholars in completing their PhD studies and publishing papers. Rather I want to raise the question of what next in our struggle going forward. Thinking about what to do differently is hard intellectual labour given the complexity of CCA described by these scholars and the limits in our practices for knowing the effects of CCAIs. In the next section I explain these two problems in more detail.

Research problem: How do we know about climate change adaptation?

The complexity and uncertainty of climate change adaptation

There is no doubt that in our time, climate change adaptation is vital for maintaining liveable places for humans on earth. And yet, the definition of climate change adaptation is not straightforward and one that has generated a long and controversial conversation (Adger, Arnell, & Tompkins, 2005; Adger, Lorenzoni, & O'Brien, 2009; IPCC, 2008; O'Brien, Eriksen,

Inderberg, & Sygna, 2014; O'Brien, 2012; Pelling, 2011; Smit & Wandel, 2006). The Intergovernmental Panel on Climate Change (IPCC) (2008) defines climate change adaptation as "the adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities" (p.6). This viewpoint considers the point of climate change adaptation as protecting the status quo of biophysical conditions and avoiding chaos in socioeconomic systems under the impacts of climate change. Others prefer to contest mere continuation and create alternatives: their stance questions, challenges, and demands irreversible changes. For example, Pelling (2011) argues that "climate change adaptation is an opportunity for social reform, for the questioning of values that drive inequality in development and our unsustainable relationship with the environment" (p.1). While these conversations are important and interesting, this thesis does not focus on the differences amongst these definitions; rather, I seek to understand the effects of climate change adaptation interventions as they occur in particular areas of Vietnam.

Climate change adaptation interventions of course draw on particular aspects of the debate about the purpose of adaptation, coming as they do with different goals, perceptions and values from experts, sponsors, authorities and related partners, each bringing distinctive decisions and judgements on the value, significance and merit of particular CCAIs (Bours, McGinn, & Pringle, 2015; Christiansen, Schaer, Larsen, & Naswa, 2016). One example of an effort to adapt to climate change that accepts that radical social and economic change might occur is the shift from "fight against water" via controlling the fluctuation of water levels to "living with water", as exhibited by the government of the Netherlands. They no longer consider only interventions focusing on constructing higher dikes, more dams and increasing pumping capacity in the Netherlands. With the innovative thinking of "living with water", water must be provided space before it flows wildly. Taking into account the potential risks, as well as safety measures such as evacuation planning, rather than only the risk of flooding has also been part of this intervention (Hendriks & Buntsma, 2009). All in all, different kinds of interventions are valued differently by different actors, and the complexity of keeping one group or area happily adapted is overwhelming once other groups, needs and places are taken into account.

The complexity of climate change adaptation is also attributed by its processual effects. The effects of adaptation activities are multiple, dynamic and active. Characteristics and variations of adaptation are defined not only by contextual practices but also by the form of

action (i.e., technological, behavioural, financial, institutional, informational), actor of interest (i.e., individual, collective), scale of the actor (i.e., local, national, international) and social sector (i.e., government, civil society, private sector), as well as the cultures of implementation (Pelling, 2011; Smit, Burton, Klein, & Wandel, 2000). The effects of CCAI are thus cross-cutting phenomena that cover broad areas such as health, economics, livelihoods, disaster prevention, food security, ecosystem services, biodiversity, natural resource systems and socioeconomic systems (Christiansen et al., 2016).

In the Vietnamese context, climate change adaptation is complicated and uncertain. Vietnam is one of the countries most affected by climate change, partly due to a long coastline of approximately 3,260 km, with lowland deltas and its location in the hazard-prone region of Asia-Pacific. Out of the 12 countries most at risk by climate change, Vietnam is ranked fourth in terms of storm risk and tenth in terms of flooding risk by the World Bank (2009). Smyle and Cooke (2012) rank it 13th out of 17 countries most vulnerable to climate change in the last 30 years. In the period from 1961 to 2010 six to seven storms occurred annually (IMHEN & UNDP, 2015). Typhoons, floods and other natural disasters affect around 70 percent of the population of Vietnam. There were approximately 9,500 people reported dead or missing and the loss of assets totalling 1.5 percent of GDP between 2001 to 2010 due to extreme climate events related to water such as floods, storms, severe droughts, salt water intrusion, flash floods and landslides (Prime Minister of Vietnam, 2011b). Because of this vulnerability, major funding has been allocated from both international and domestic sources to support the people of Vietnam in adapting to climate change.

Vietnam does not, therefore, rely only on the work of Vietnamese scholars such as the above-mentioned PhD holders and Vietnamese agencies in climate change adaptation efforts. Many scholars from abroad are working on climate change adaptation in Vietnam, such as Adger (1999); Buch-Hansen, Khanh, and Anh (2013); Knaepen (2014); Lindegaard (2013); Radhakrishnan, Pathirana, Ashley, and Zevenbergen (2017); Tessier (2013); Zink (2013); Christoplos, Ngoan, Sen, Huong, and Nguyen (2017); Schmidt-Thomé et al. (2015); and Miller (2003, 2014, 2019), amongst others. The findings of this research commonly focus on the fact that CCAIs in Vietnam are subject to top-down and technocratic management regimes. They also trace many other influencing factors involved in the development, implementation and management of CCAIs in Vietnam. For example, the kinship and other social relationships,

political interests, values and perspectives of practitioners or officials can affect how particular CCAIs are formed and implemented in specific contexts (Zink, 2013). Alternatively, Lindegaard (2018) states it more bluntly: climate change adaptation in Vietnam is not based on some kind of neutral scientific evidence, but, like many places, primarily on national political concerns. This means that CCAIs and their effects are both socially and politically constructed, which presents a challenge to us in knowing their effects.

How do we know what works? Questioning the monitoring and evaluation of adaptation interventions

Monitoring and evaluation[1] (M&E) is considered crucial in order to get closer to understanding the effects of CCAIs. M&E can give us an indication as to whether CCAIs are working or not and what is really happening, especially on the ground. However, our M&E practices, or the ways we get to know and represent the effects of CCAIs, are not neutral measurements: they also create some of the problems that this thesis aims to address.

When it comes to M&E, questions foremost for many are: Are these CCAIs actually contributing to the process of adaptation or are they somehow causing maladaptation? What does a successful adaptation look like? What lessons have been learnt that could be used to support adjustments in future directions, strategies and particular adaptation measures? (Bours, McGinn, & Pringle, 2014; Bours et al., 2015; Hedger, Mitchell, Leavy, Greeley, & Downie, 2008; Spearman & McGray, 2011). M&E of CCAIs is therefore crucial**.** Good M&E systems for CCAIs are most significant not only to measure, describe and judge outcomes but also to maintain benefits, create initiatives from post-implementation and inform better ongoing adaptation.

Due to close links between CCAIs and development programmes in Vietnam and other parts of the world (Adger, Huq, Brown, Conway, & Hulme, 2003; Ayers & Dodman, 2010;

[1] According to Scriven (1991, 2013), *evaluation* is the process of determining systematically the merit, worth or significance of any intervention, project, policy, programme or activity, while the OECD (2002) defines *monitoring* as a continuing function for collecting systematically data regarding the progress and achievement of intervention, programme, policy and activity. In my understanding, in order to evaluate any intervention for managerial purposes, we need the results from the process of monitoring. In this thesis, I use the term “monitoring and evaluation” (M&E) and “evaluation” interchangeably. However, in the Vietnamese context, there is always implementation of both these activities for decision-making processes and management. I thus primarily use the term “M&E” and reserve “evaluation” for when I quote someone or refer to other scholars’ arguments.

Ireland, 2012; O'Brien et al., 2014), current mainstream M&E practices for CCAIs have evolved specifically from the practices of development programmes. Many existing methods and approaches are adopted, integrated and revised for M&E of CCAIs (Bours et al., 2015; Fisher, Dinshaw, McGray, Rai, & Schaar, 2015; Hedger et al., 2008). As discussed, CCAIs are, however, much more complicated and complex than conventional development programmes. Due to the uncertainty and the long-time horizon of climate change, for instance, it takes decades to see an expected impact or perceive a maladaptation of an intervention, which often falls beyond the development programme cycle. This means that monitoring and evaluating CCAIs based on M&E systems developed for general development interventions will probably miss and underestimate their relevant and emergent impacts.

M&E targeted to CCAIs is quite new, emerging late in the 2000s (Christiansen et al., 2016; Hinkel et al., 2013; Van den Berg & Feinstein, 2009). Since then, many approaches and frameworks have been developed. Some of these approaches remain more theoretical than practical and are quite simplistic in actual practice (Bours, McGinn, & Pringle, 2013). These mainly focus on the outcomes of interventions rather than on their ongoing effects (Schwandt, 2003). But in the context of climate change, the purpose of M&E should be "learning and reflecting on whether we are taking the right actions for the right things for current and future generations" (Uitto, Puri, & van den Berg, 2017, p. 5). There are further challenges to consider: long time horizons, uncertainty, insufficient data, confusion around evaluating the contribution and attribution of CCAIs to the measured outcome, and the differing perspectives, goals, scales and values that complexly interact in determining M&E results (Bours et al., 2015; Fisher et al., 2015; OECD, 2015; Viggh, Leagnavar, Bours, & McGinn, 2015). M&E practices for CCAI also need to acknowledge and be cognisant of contingence, uncertainty, dynamicity and complexity (Patton, 2015; Schwandt, 2002, 2003). On the whole, a lot is being asked of M&E in this era of climate change and relevant adaptation.

In order to attempt to meet all these demands for high-quality M&E of CCAIs, practitioners turn to scientific methods. Thomas A. Schwandt, a prominent thinker within the field of M&E, states that, at its essence, "[e]valuation is a modernist practice that aims to help us live more intelligently in the world" (Schwandt, 2003, p. 353). To ensure good M&E outcomes, the "[m]ajority of evaluation approaches […] promote instrumental rationality" (p.30), and evaluators endorse "the means of scientific reasoning" and technical performance

(Schwandt, 2002). Put simply, M&E researchers and practitioner evaluators work as scientists to ensure that M&E results are analytical, rational and legitimate as scientific evidence for good decision-making.

M&E scientists (or evaluation scientists) were part of the recent unprecedented series of Marches for Science all over the world. Provoked by the problematic views on climate change and science expressed by Donal Trump, the president of the United States of America and his administration, the first and largest of these events was held on 22nd April 2017 in Washington DC, spreading to more than 60 countries and one million marchers participating worldwide (March for Science, 2017). Many scientists, researchers and other interested parties joined in these marches. Among them was Michael Patton, who is well known in the field of M&E. Along with his children and grandchildren, he was excited and inspired by the demonstration in Washington, DC. When responding to questions about his relationship with science, Patton often answered, "I am an evaluation scientist. I do evaluation science" (Patton, 2018a, p. 183). Thus we see that the idea of being an evaluation scientist is compelling for many: Patton in particular and in M&E circles more generally.

A scientific orientation is important within the field of M&E. At the biennial international evaluation conference[2] in Guanajuato, Mexico, in December 2017, participants gathered to work toward the development of an international evaluation society. I was one of more than 540 participants from around 60 countries from all parts of the world. Many presenters spoke of their awareness of the world as a complex, unpredictable and uncertain place, and there were many presentations and talks on methods, frameworks, approaches, research results and alternatives for future M&E. Many different styles of M&E were presented: quantitative or qualitative, deductive or inductive, objective or subjective, evidence-based or storytelling, among others. Through the conference's busy schedule, most of the conversations I had seemed to be with people who shared a similar desire: that alternative M&E approaches should be flexible, diverse and comprehensive, but also robust/analytical, empirical and scientific.

[2] Specifically, the Joint Conference on Evaluation for the Sustainable Development Goals: Transforming Life through Global and Regional Partnerships, with an Emphasis on Latin America and the Caribbean.

Others, however, reject the claim that M&E should be considered science. The well-known scholars within the field of M&E, Guba and Lincoln (1989, p. 7), admit that they "do not treat evaluation as a scientific process, because it is our conviction that to approach evaluation scientifically is to miss completely its fundamentally social, political and value-oriented character". For commentators such as Guba, Lincoln, and increasingly me, realities are not smooth; they are diverse, multiple, elusive and uncertain, especially the effects of CCAIs on the ground. Applying scientific M&E practices, we therefore may "abstract from and reduce actual cases of real things and events to deal with idealized representations" (Schwandt, 2003, p. 353). More importantly, relying on scientific modes we can be trapped in the mistaken notion that decision-making can be better only with the support of more scientific M&E information. It is the argument of this thesis that the misinterpretation of reality also can craft other realities in favour of particular pre-determined assumptions, since M&E is always a social and political practice. Scientific orientation or familiar patterns are forms of "business-as-usual", which arguably created the problems we are facing environmentally in the first place (Escobar, 2018). I will return to the pitfalls of scientific modes in terms of M&E practices later in the thesis, but for now, my point here is that there is a crucial need for alternative thinking that goes beyond what is conventional and common in the scientific modes of M&E practice. This alternative scholarship would ultimately support us in developing, implementing and managing CCA more appropriately and meaningfully.

In short, for better thinking about what to do differently for climate change adaptation, the thesis needs to consider the complexity and uncertainty, and the current limitsin knowing our work particularly the pitfalls of the dominance of scientific M&E practices. The former makes it difficult for us to know what really happens in relation to CCAIs on the ground, while the latter, with the dominance of scientifically oriented abstracts, oversimplifies the realities of the effects of CCAIs, and even creates other realities. In the next sections, I now examine some research approaches that enable us to find the pathways towards better knowing about realty in relation to CCAIs.

Research approach: Embarking on experimentation

Our contemporary mindset reflects how we see and think about what we study, like many others who look at the sky and quickly pick up the configuration of stars for the Orion

constellation as they have been taught rather than seeing and thinking of the many stars visible beyond this constellation (Roelvink, 2016). Although there are many other constellations as well as the Milky Way and galaxies in the night sky, when we go outside at night, many of us look only for Orion. So how do we get out of the strictures and structures of common thinking? How can we see and think beyond that popular "constellation" of our fields of study?

I am not alone in this kind of struggle. As anarchist geographer Simon Springer points out, "it is now commonplace, and even trite to suggest that it is high time that we tried a radically different approach" (Springer, 2016, p. 22) in this time of human-induced climate change. Many of us struggle with the task of coming up with "radically different approaches" or "reworking ourselves and our societies" because we are simply not trained or prepared to do it. We resist this not because it is untrue or unimportant but because—if we are honest—we don't know how to do things differently, and indeed, what else might be happening under our own eyes as our critical scholarly gazes seek out familiar patterns (Dombroski & Do, 2019).

In my case, the more I struggled to find a way to do something more significant and meaningful for CCA in Vietnam, particularly M&E practice, the more I was led to pursue a more scientific orientation even though I am aware of its pitfalls. I seemed to have a good excuse because of my background in the environmental sciences and nine years of work experience in government organisations where all projects are evaluated against a set of "scientific" criteria. I am also a member of the Communist Party of Vietnam and grew up with communist parents. For me, my deeply rooted belief in "science and technology" heavily outweighs spiritual, religious and local knowledge. We are always be encouraged to *escape* the *lũy tre làng*/ "local bamboo bush"[3] and *seek out* ways to go further to the *biển lớn*/ "great oceans", then ultimately *sánh vai* với *các cường quốc năm châu*/"to join in with major advanced nations". [4] Like many others, I am embedded in this culture, so to progress is considered equivalent to working towards advancing science and technology and *not* paying attention to

[3] *Lũy tre làng* "local bamboo bush" is a common image used to refer to a rural community, particularly in North Vietnam where there are a lot of bamboo stands. To some degree this image also is a spiritual and soulful metaphor of the local people referring to the resilience of bamboo in storms and the power and elasticicity of collective and collaborative survival even though the trunk of the bamboo is thin. However, the knowledge formed in the context of "bamboo bush" is also considered as short-sight, shallow, narrow and undeveloped.

[4] *Sánh vai cùng các cường quốc năm châu*/ "join in with great developed countries" is one of famous government campaign has been taught at schools across the country for many years.

the bamboo bush of local knowledge, spiritual beliefs and customs. The latter was even often seen by me and my colleagues as backwards and impractical.

Yet much of this framing I have had to call into question. In my struggle for doing something differently or for alternative scholarship in doing M&E of CCAIs, my thesis has to engage with how and what we represent as reality, mainly because M&E requires the representation of the effects of CCAIs as realities. I thus became interested in the bodies of knowledge in the fields of postdevelopment and science and technology studies (STS). While the postdevelopment school works on the failure and limits of development discourse and practices on the ground, particularly in developing countries (McKinnon, 2007), the core of STS is the role of the social world in shaping scientific knowledge and technology. Both these two fields study modern bodies of knowledge, each seeking to answer the question how we might "really know" about what happens in the world. In addition, being aware of our mind-set affecting our knowing about reality, such as in the example of knowing the constellation of Orion, I also interested in the change of our understanding of ourselves as research subjects. This change would definitely influence our knowing about reality.

Within the scope of a PhD thesis, one might choose to work using one theoretical approach only. However, as discussed, I do not know which approach could help me see what is "radically different" and could support me in avoiding the same problems of critique without new thinking mentioned above.

In this thesis, I therefore explore these three experimental approaches, which allows me to use the process to figure out which approach would support me to come up with something different. Through these experimentation processes, I will have distinctive layers of knowing on CCAIs and its effects on the ground (see Figure 1). In that way, I have been engaged in experimental, and process-based monitoring and evaluation of my own work. This is because I am primarily interested in the kind of experimentation that is not about testing my hypotheses but rather about learning from doing. Cameron (2015) calls this intention the experimental attitude. Doing research with this attitude, while we risk not producing clearly beneficial outcomes, our work sometimes brings about different outcomes or offers possibilities for new and different things to come into being (Cameron, 2015; Cameron, Manhood, & Pomfrett, 2011). The important point here is that in the context of M&E of CCAIs in Vietnam, this experimentation is not for producing a certain kind of knowledge or practical

outcome; rather it is for the trying of *new* things, and being more responsive and adaptive to the complexity, uncertainty and unpredictability of the climate change context, particularly where our stubborn scholarship often seeks to apply conventional and familiar patterns dominated by scientific orientation.

In the three following sections, I will clarify, in turn, how these three experimental approaches or distinctive layers can support me in getting to know realities in relation to climate change adaptation.

Knowing reality through a postdevelopment perspective

Climate change adaptation interventions are associated with development programmes, particularly but not exclusively in Vietnam. Therefore, I am firstly interested in the way postdevelopment scholars explore and represent the local effects of development programmes, which share common characteristics with water-related CCAIs in Vietnam.

Since the emergence of postdevelopment critique in the early 1980s, for many postdevelopment scholars, such developmentalist CCAIs are potentially part of the general failure of development programmes. Writing in the introduction to the classic collection *The Development Dictionary: A Guide to Knowledge as Power*, Sachs (1992) states that

> The idea of **development stands like a ruin in the intellectual landscape**. Delusion and disappointment, failures and crimes have been the steady companions of development and they tell a common story: it did not work. Moreover, the historical conditions which catapulted the idea into prominence have vanished: development has become outdated. But above all, the hopes and desires which made the idea fly are now exhausted: development has grown obsolete. (p.1)

Along the same lines, Escobar (1995) in his landmark book *Encountering Development: The Making and Unmaking of the Third World* clearly criticises the practice of discourse of development for creating the opposite of what it intends: undeveloped, oppressed, impoverished results for the places that it encounters. Shrestha (1995) adds the painful result of "colonial mindsets" to the sins of development, reflecting on his own memories and experiences with development programmes in Nepal. Climate change adaptation interventions coming out of the development funding and programmes in Vietnam and other places would surely be included in this general despair about the possibilities of development.

In the onset period of the postdevelopment project, many scholars understood and perceived postdevelopment as anti-development (Omar, 2012; Simon, 2006). To be honest, however, I am a development worker as well as being the so-called “development subject” or “product of development”. I cannot totally be convinced by the kind of anti-development arguments that dismiss any hope of redeeming attempts to make life better for the poor and marginalised. I do perceive some benefits from the development programmes in my country, my hometown and my personal life. For example, there is impressive progress in terms of education and a decrease in the rate of infant mortality in Vietnam due to development programmes (World Bank, 2003), both as officially reported and from my own observations and knowledge. However, development programmes in Vietnam (and in particular my work on CCAIs and natural resources management) often bring changes for the places they set out to change. As McKinnon (2011) argues, these changes are not always what they intended. For years, I drew on the hope and desires implicit in my work, establishing and implementing many development projects. I have also experienced cynicism in the face of the predictable hype of development discourse, as well as failure, disappointment, delusion and even unethical or inappropriate practices in my own previous development related work. Yet in all this, from my work I have experienced both the benefits and failures and maladaptation of development programmes. , And there is no sign of any decline of development programmes in doing CCA and other kinds of development projects in Vietnam.

I believe I have managed to contribute to better development programmes, particularly in my work in water-related CCAIs in the province of Thai Binh. However, I am also aware of the limits and failures of development programmes and the neocolonial patterns of conventional research methods, particular in development of M&E, where the priorities and methods of mainly Western institutions are normalised and indeed prioritised. My main intention for this thesis is thus to explore, to know, and then to interpret the *in situ* effects of water-related CCAIs, but not with an anti-development stance or an intention for judging their apparent success or failure. Rather, my goal is to explore pathways toward viable and remediable alternatives.

In looking for viable and remediable alternatives, I am somewhat at odds with other postdevelopment scholars. Escobar (1995), for example, dismisses attempts to design viable and remediable alternatives as mere “development alternatives” that are not real alternatives

to the ever-problematic idea of development. The former, although may bases in grassroots movements, still merely works with the criteria of the conventional project of development; the latter is more about the idea of a significant change in the very paradigm, or of going *beyond* the notion and discourse of, conventional development (Escobar, 1995). But I am not completely alone in my refusal to dismiss development completely: other scholars of postdevelopment encourage us to not think of development as the enemy or to abandon development entirely but rather to engage in critical thinking, to reflect and to be open to alternatives as they emerge (Omar, 2012). Similarly, McKinnon (2007, 2011), via her long-term work on development in northern Thailand, advocates for a postdevelopment perspective that is not so much about the failures and crimes of development and instead attempts to ensure that "social justice and emancipation can coexist alongside the messy realities of development work" (p.772). Gibson-Graham (2005) also supports my perspective, clearly stating:

> The postdevelopment agenda is not, as we see it, anti-development. The challenge of postdevelopment is not to give up on development, nor to see all development practice - past, present and future, in wealthy and poor countries - […]. The challenge is to inmagine and practice development differently. (p.6)

Even those who have been practising and studying development for lengthy periods have the potential to shift to a more postdevelopment perspective. Development scholar Robert Chambers, with his 60 years of experience in development studies, asks us to imagine and practice development differently, encouraging us in seeking and learning to know better from the inside (Chambers, 2017). Ireland and McKinnon (2013) directly apply this postdevelopment approach to explore climate change adaptation interventions, particularly in local communities in Bangladesh and Nepal, in order to reveal the latent possibilities for different worlds.

The first key experimental approach in this thesis, then, is to seek to capture richly the effects of CCAIs on the ground—not just hopes and desires but also disappointments and failures. This would imagine current CCAIs or developmentalist programs differently from conventional approach. My argument, here is that the postdevelopment perspective would lead me to multiple seeing of the effects of CCAIs and critically reflect on what do happen on the ground. From this, we can create favourable conditions for the emergence of alternative

to current developmentalist adaptation. Following the recommendation of Chamber, Gibson-Graham, Escobar, Mckinnon and other scholars above, the appropriate starting point for possibly finding the alternative is from within and between the development practices. In addition, to me, this experiment is also pointing to the task of monitoring and evaluation of CCAIs, a task that in essence seeks to answer the question of whether we are doing the right thing for climate change adaptation (Uitto et al., 2017).

Knowing reality with science and technology studies

The second experimental approach for this thesis is to explore the usefulness of the work of Bruno Latour and his colleagues such as John Law, Michael Callon, Steve Woolgar, María Puig de la Bellacasa and other STS scholars. In particular, I was fascinated by the early work of Latour and Woolgar (1979), where they conducted ethnographic observation of scientists in their laboratories, trying to understand how a scientific fact is discovered, indeed, "constructed". In doing so, they were able to get at the limits of scientific facts and our ability to know anything about matter and reality. Latour describes a stubborn stance, the reasons why our visions are trapped within particular constellations formed by scientific orientation, as scholarship primarily concerned with "matters of fact" (Latour, 2004c, 2005, 2014). When I engage in this kind of "matter-of-fact" scholarship, I indeed reveal and represent the effects of CCAIs as scientific facts. In my work as researcher, evaluator and knowledge worker, I have revealed and represented rationally, legitimately and scientifically the effects of interventions. But these do not necessarily contribute to radical change and new possibilities, toward more appropriate CCAIs.

I then follow Latour in his scholarly move from thinking with "matters of fact" to thinking with "matters of concern". Unlike thinking with "matters of fact", which attempts to document reality in ever more realist detail, thinking with "matters of concern" means focusing on a gathering of involved things that form a particular reality. This involves evaluating or interpreting and identifying "what matters" for particular stakeholders, other entities and evaluators, and then negotiating moving forward for more appropriate solutions. I will return to these key ideas and what they mean for our knowing of the effects of CCAIs in Chapters 3 and 4. For now it is enough to say that STS scholarship helps me in my need for some kind of (postdevelopment) epistemological change in representing the effects and manifesting the

possibilities of the water-related CCAIs I study. STS perspectives help me to explore the social and technical nature of doing monitoring and evaluation of water-related CCAIs, opening up the mechanisms by which adaptation and our knowledge of adaptation occurs. It seems to me that this allows us new knowledge, different thinking, on the merit, worth and significance of the expected and unexpected effects of CCAIs at the grassroots level. These could ultimately lead to differently imagined climate change adaptation.

Knowing reality through knowing myself

In bringing together both postdevelopment and STS approaches to knowing about reality, I perform a kind of epistemological change only hinted at by Latour in his shift from "matters of fact" to "matters of concern". This thesis embodies a third experimental approach threaded throughout, which is that of serious *re-subjectification,* the task of reconfiguring ourselves as researchers, and indeed, becoming the subjects of our own research. For those of us who have grown up with a faith in science, technology and development, like me and other PhDs mentioned earlier, this re-subjectification can indeed be painful. I recently co-authored a paper with my peer PhD candidates that focuses on how we as subjects of development have had to painfully find a way to re-think and do more than perform realist criticism within the confines of development (including our hope for a utopia emerging from science and technology). This re-subjectification is a process whereby we and our research can contribute something more meaningful and significant to our own countries in the Global South (Liu et al., forthcoming). The thesis, as follows, traces my own experiments with knowing reality, challenging reality and opening up to the possibilities of different realities.

Within the scope of one PhD study, the process of re-subjectification is merely about my own personal mental journey in knowing about the effects of water-related CCAIs in the province of Thai Binh, Vietnam. This province is also an agricultural and coastal area, and the location of my hometown where I was born and grew up. For me, so many things in Thai Binh are about embeddedness and belonging. Local people, landscapes, weather, social aspects, culture, religions and livelihoods seem very familiar to me and connected with me. However, belonging and familiarity do not mean that I have a *better* knowing about Thai Binh and local realities. As discussed, I was a scientist, development worker, governmental official and researcher. Under normative and conventional research methods, knowing about local

realities does not extend to my own belonging and familiarity with Thai Binh—indeed, my subjectivity. Paying attention to the process of re-subjectification as such offers me a new pair of spectacles, which results in my acquiring a different knowing about my hometown. Chapter 4 and 5 will discuss this knowing in more detail. For now, I want to argue that the process of re-subjectification will play important role for knowing "what really happens" at a local community in the province of Thai Binh.

I am seemingly not alone in my process of re-subjectification. In particular, at the recent conference of the European Evaluation Society in Greece in 2018 I was heartened by the knowledgeable M&E theorist Thomas A. Schwandt presenting a similar perspective in his provocative talk. In what he calls *post-normal* evaluation, he urged us as evaluators to put more of our own subjectivities into M&E practices and encouraged us to ask ourselves, "How do evaluators go about their work?" or "What is evaluators' work is about?" in order to get the point of post-normal evaluation. Bringing forth the subjective elements of M&E is not to destroy M&E but to make it more meaningful and significant. Given that our subjectivity influences and even partly constitutes the realities we attempt to monitor, paying attention to our own subjectivity (and indeed re-subjectification) can lead to more meaningful and significant M&E outcomes. M&E thus, does not just only considers the effectiveness of the interventions regarding to the merit, significance, and value, but also how the evaluators influence the M&E results. This means doing M&E differently: we could say M&E is as much *affective* as effective. In Chapter 6 I will discuss in more detail this kind of evaluation. For now I want to emphasise that these questions have been raised by leaders in the field of M&E but have not been answered as yet. I make my contribution to answering them in this thesis.

Research project: Examining the effects of climate change adaptation interventions

Research questions

I have pointed out our struggles in knowing realities, particularly the effects of our work, which also limits us to do something really different and might be more meaningful and appropriate in the work of climate change adaptation. The first overarching goal of this thesis thus is to answer the question: *How do we really know about the effects of our knowledge-making work on CCAIs?* However, it is not about revealing or presenting the limits and challenges of current CCAIs but rather finding solutions, illuminating, creating potential

possibilities toward more appropriate adaptation for better world. For something really different, the thesis then seeks to broaden its outcomes by setting up the second research question: *How can we really get at possibilities of changes? Or, how can we bring our research findings (needed changes) into being?*

To assist in answering these two guiding questions, there are six specific questions below. By answering these questions respectively in six chapters, the thesis manifests the experimentation through distinctive approaches or three layers of knowing of local realities in relation to CCAIs in the province of Thai Binh.

First, there is a need to document the contextual background for the main arguments to come. The thesis first addresses the question:

1. How does Thai Binh province support its people to adapt to climate change in terms of water-related issues?

Second, this thesis seeks to explore how CCAIs work on the ground. This inspires the questions:

2. How are water-related CCAIs enacted on the ground? Do their effects make a difference for locals in the province of Thai Binh?

This thesis thirdly seeks to explore our common practices in interpreting local realities through the practices of M&E. Another question thus needs to be addressed:

3. In what ways do our M&E practices affect our M&E results for water-related CCAIs?

Then this opens up the question of:

4. What is an alternative *to* M&E (indeed doing M&E differently) for knowing the effects of water-related CCAIs?

This thesis then tests that alternative by asking:

5. What do we know about local realities in relation to the effects of water-related CCAIs through that alternative?

And finally, to then broaden out to really getting at practical possibilities and changes, the thesis asks the question:

6. What then should researchers and evaluators do to put the needed changes (the research findings) into practice?

This means that the outcomes of this thesis do not merely involve an expectation of documenting local realities in relation to CCAIs but also of acting on and then opening up possibilities to make research outcomes, to some degree, literally “matter” or to establish certain material realities that might emerge from this work.

Research methodology

It is probably clear by now that this thesis is formed through a journey of experimentation, one whereby I carry out tests, reflect, and re-subjectify myself from the starting point of being a subject of development or one who embraces a scientific orientation. This is also a typical example for researchers and knowledge workers who are seeking to do something differently in response to the call for radical transformation mentioned earlier (Springer, 2016). This means that my personal struggles and my re-subjectification are also rationales for the need for carrying out this thesis, and the starting point for finding out solutions or at least shedding light on the pathways toward sustainability and perhaps even transformation in my hometown, my own country and beyond.

The methodology for the thesis is thus informed by what Cameron (2015) calls “lived experiments”, emerging from that which already exists and is available around us in daily life as researchers. The process of experimentation with three layers of getting to know local realities, thus led to *two* field trips using the *two* distinctive methodological approaches employed in this thesis. The first field trip was carried out April to July 2016. This trip was heavily informed by the most recommended approach for researching development programmes (Chapter 2), the sustainable livelihoods approach (SLA), which determined particular research methods such as analysis of archival sources, semi-structured interviews, focus groups and transect observations. This field trip, along with these standard, analytical and scientific research methods, also formed much of the work in the first three chapters in the thesis. The second field trip was a more open participatory experiment without pre-ordained research activities, and took place October to December 2017. This trip focused on

my embodied experience and that of locals, using the body as an instrument of research (the visceral/embodied approach) for disclosing and interpreting local livelihoods and daily lives in relation to water-related CCAIs in the province of Thai Binh.

In order to better illustrate how this study was carried out and the research methods applied, Chapter 2 will detail the specific activities that form the methods for my study before the process of my re-subjectification. Chapter 4 will describe the embodied approach taken as the second methodological approach used in this study, supporting me in answering my research questions. More detail on how these two methodologies are deployed will be elaborated as appropriate in the thesis.

Thesis overview

I now turn to the thesis outline, offering a guide to help the reader navigate the progress of the thesis to achieve its goals. The Figure 1 below illustrates the structure and how the main arguments in progress to achieve overall thesis goals. With different experimental approaches, this thesis structure, thus, is a journey unfolded by different layers of knowing. It does not follow a standard format of a common PhD thesis.

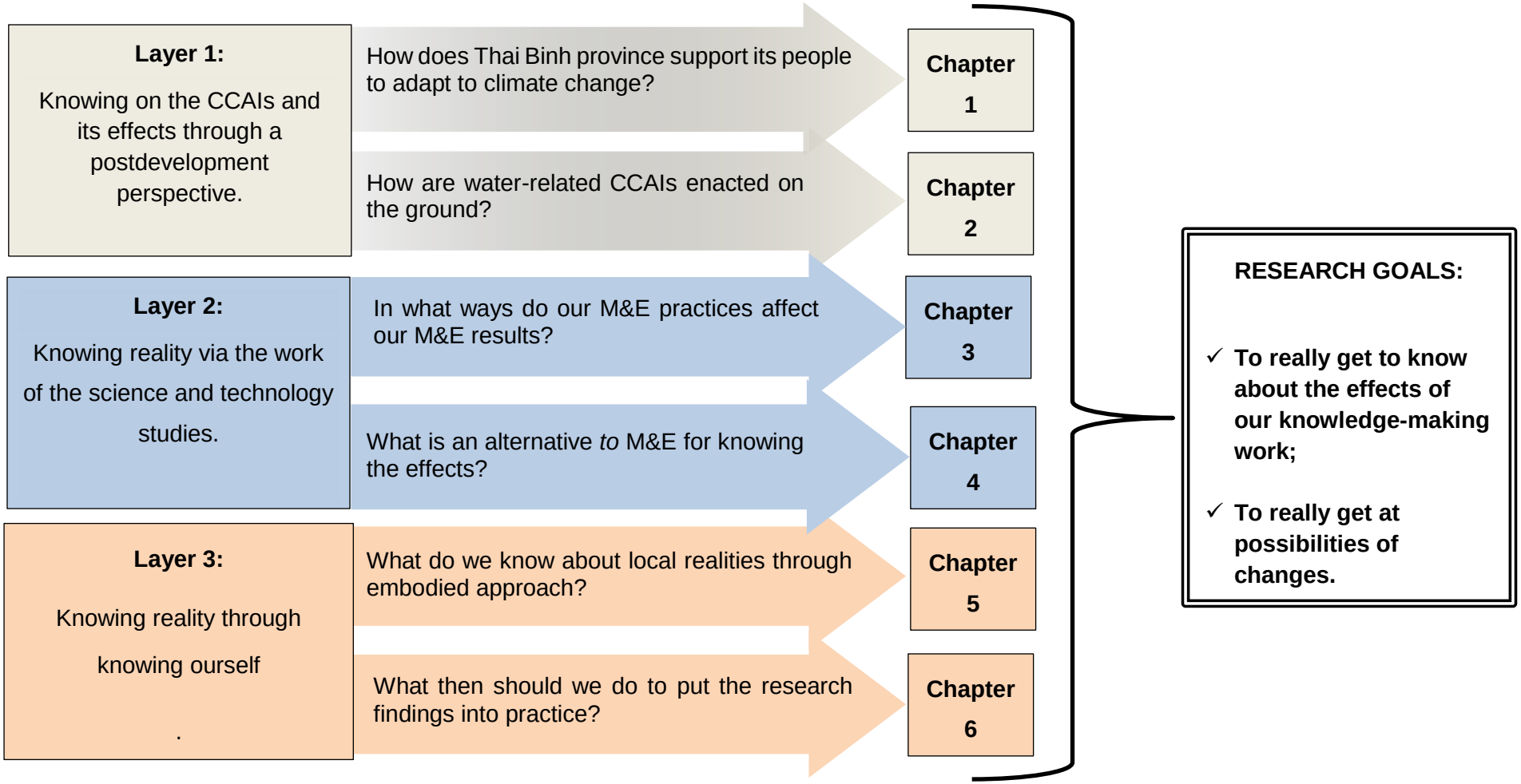


Figure 1: The thesis structure corresponding to research questions and approaches

In this introduction I discussed the main issues that incited me to pursue doctoral studies. These include our stubborn thinking in seeking out the familiar patterns that we have, somehow knowing they will probably not work in dealing with the complexity, unpredictability and uncertainty of climate change and its relevant interventions, and our limits in knowing the effects of our work, particularly CCAIs. For finding a path forward, the thesis embarks on an journey of experimentation based on knowledge body of postdevelopment projects, the lens of STS and the process of re-subjectification. These three experimental approaches form the six research questions, and are associated with the six main chapters of the thesis.

Chapter 1 presents *the scene of action*, explaining the why, what and how of the Thai Binh provincial government's water-related CCAIs support its residents. Key circumstances characterising the province are conveyed, particularly the complexity and difficulty in ensuring sufficient water for rice farming—the most important source of livelihood for locals. In its review or the common knowing of current water-related CCAIs, this chapter questions these government-led interventions and their management culture in terms of unpredictability and complexity, as well as their effects on local livelihoods.

Chapter 2 experiments with a postdevelopment perspective for a richer knowing of local livelihood realities. This knowing includes the mess of the effects of typical development programmes like water-related CCAIs, which in turn supports to open possibilities for alternatives to climate change adaptation in Thai Binh. To achieve this, I first seek an appropriate methodological approach and research activities. The sustainable livelihood approach (SLA), a comprehensive analytical framework, is explored and amended, and then applied for representing local livelihood realities due to the effects of water-related CCAIs in my two case study communities, Nam Hung and Quoc Tuan. Through the lens of the SLA, this chapter sheds the light on the processes by which locals make their living, and indeed on local livelihood trajectories. The benefits and maladaptation, constraints and opportunities are thus made clear. The chapter also points out the uncertainty and unpredictability of our knowing on the effects of water-related CCAIs through the SLA. It then argues that for the emergence of alternative or more appropriate adaptation, we need to acquire knowledge and practices that are able to work under the uncertain and unknowable futures.

Chapter 3 adopts the second experimental approach, following the work of the STS, for knowing reality. This chapter particularly explores the process of current mainstream M&E

practices for M&E results of water-related CCAIs in the province of Thai Binh. It conveys the common scholarship embedded within the M&E community, indeed the “matters of fact” (in the words of Bruno Latour) which focus on representing the effects of water-related CCAIs for the sake of critical realism. The chapter looks at how scientific modes dominate current M&E practices, the process by which scientific practices commonly produce results or realities, and how M&E practices amplify, perform and establish realities.

Chapter 4 harnesses the concept of “matters of concern” developed by Bruno Latour and his recommendation for moving away from “matters of fact”. The chapter then examines “matters of concern” scholarship for doing M&E practices. In order to elaborate on how we can begin to pursue this alternative scholarship, this chapter explores some existing examples that have succeeded in developing alternatives within their study areas. This chapter also exposes the process of my re-subjectification in the scholarly move from “matters of fact” to “matters of concern”. In this way, the experimental approach of getting to knowing reality is examined, partly through understanding myself as a subject of my own project. This chapter then ends by proposing combining an embodied approach for doing M&E differently, considered as an alternative *to* M&E.

Chapter 5 applies the embodied approach to disclose and interpret the effects of water-related CCAIs on local livelihood realities. To know local reality through local embodiment, I first focus on relationships and conversations between locals and other involved entities in their farming projects. The second and third sections interpret the processes whereby locals and involved others negotiate, work collaboratively and then form their appropriate livelihood behaviours, including existing and ongoing adaptation, in responding to changes due to climate change and water-related CCAIs. In contrast with Chapter 2, the interpretation of the effects of water-related CCAIs in this chapter includes the question of “what matters” for locals and other entities. This interpretation is meaning-laden, and more importantly interprets how locals form their decisions toward more meaningful and appropriate adaptation.

Chapter 6 aims to explore further the effects of embodiment on either farming projects or research and M&E projects in climate change adaptation work. First, this clarifies how locals produce new useful knowledge out of their embodied experiences and engagement with all other involved entities and in turn form their appropriate adaptations. Second, this chapter teases out the lessons that researchers and evaluators can learn from locals in order to

achieve more appropriate and meaningful outcomes from their work. In so doing this chapter broadens out the embodied knowledge of local farmers, researchers, and evaluators to the point of really getting at the practical possibilities and changes that they want to emerge from their work.

The conclusion wraps up with a final overview of the progress made towards the overarching goal and of the contributions of the thesis theoretically, methodologically, and practically. In particular, I advance the idea of activist research in a climate changing world.

CHAPTER 1

THE HOMELAND OF RICE, WATER AND DEVELOPMENTALIST INTERVENTIONS

Nhất nước, nhì phân, tam cần, tứ giống

The first priority is water, the second is fertiliser,

The third is caring intensively and the fourth is the seed variety.

Lúa khô cạn nước ai ơi

Rủ nhau tát nước, chờ trời còn lâu.

Rice plants are dry;

We should all irrigate together; divine rain is not coming soon.

(Vietnamese proverbs)

1.1. Introduction: Common knowing for developmentalist adaptation

In its role of setting up the rest of this thesis, this chapter aims to explain why Thai Binh province has begun to do water-related CCAIs and how it supports its people in this regard. In many ways, this chapter sets the scene of the action for the thesis. The chapter, therefore, begins by briefly documenting general information on the province, including its geographical, social, natural and cultural conditions and locals' daily lives. Known as the "homeland of rice", the chapter then discusses rice production in Thai Binh province, as well as biological cycles and other necessary farming techniques. I then emphasise water-related issues in relation to rice farming, especially under climate change impacts. From these highlights, I explore the main subject of the thesis, which is how governments do their CCAIs in general and water-related CCAIs in Thai Binh particularly.

This chapter also expresses my initial understanding on the developmentalist interventions as a normative evaluator and researcher could do in trying to monitor and evaluate their effects. It is the starting point of my journey of experimentation via different approaches in knowing the CCAIs and its effects. However, embarking on experimental approaches in doing my thesis, the main arguments thus do not necessarily focus on unfolding the effects of current CCAIs as problematically as it might appear. The chapter then does not end by criticizing the current CCAIs, rather it questions the problems of CCAIs and the culture of implementation and management with an eye to better adaptation. This is also the question formed by thinking with a postdevelopment perspective, which in turn leads to my knowing of local realities in relation to the government-led CCAIs clarified in the following chapters in this thesis.

1.2. Introduction to Thai Binh province

Thai Binh literally means being in a state of "peace". Thai Binh was delineated and named as an independent province in 1890. It was formed mostly by reclamation of swamp areas and offshore bars, which are the result of the silt depositions of the Red River's estuaries and the sea (Devienne, 2013; Nguyen Quang An & Nguyen Thanh, 2006).

Thai Binh is a coastal province facing the South China Sea in the east of Vietnam. It is characterised as an island, surrounded by the Red River in the west and south, and by its tributaries in the north, namely the Luoc and the Hoa Rivers (see Figure 2). Monsoons dominate the climactic conditions. The subtropical climate is typically humid and hot. The seasonal mean temperature is around 23 ±1°C, with the coldest period mostly in January, when it can fall to 10°C, and the highest in June or July, when it can reach 40°C. The average annual rainfall is 1,500–1,900 mm, with the annual mean humidity being around 84.5%. Summer is associated with the wet season, which starts in May and ends in October. Around 80% of average annual rainfall is in the wet season, when maximum intensive precipitation can reach 200–300 mm/day. Winter is associated with the dry season, which starts in November and ending in April. While July, August and September are considered the rainiest months, December and January are the driest (DONRE, 2012; IMHEN, 2010).

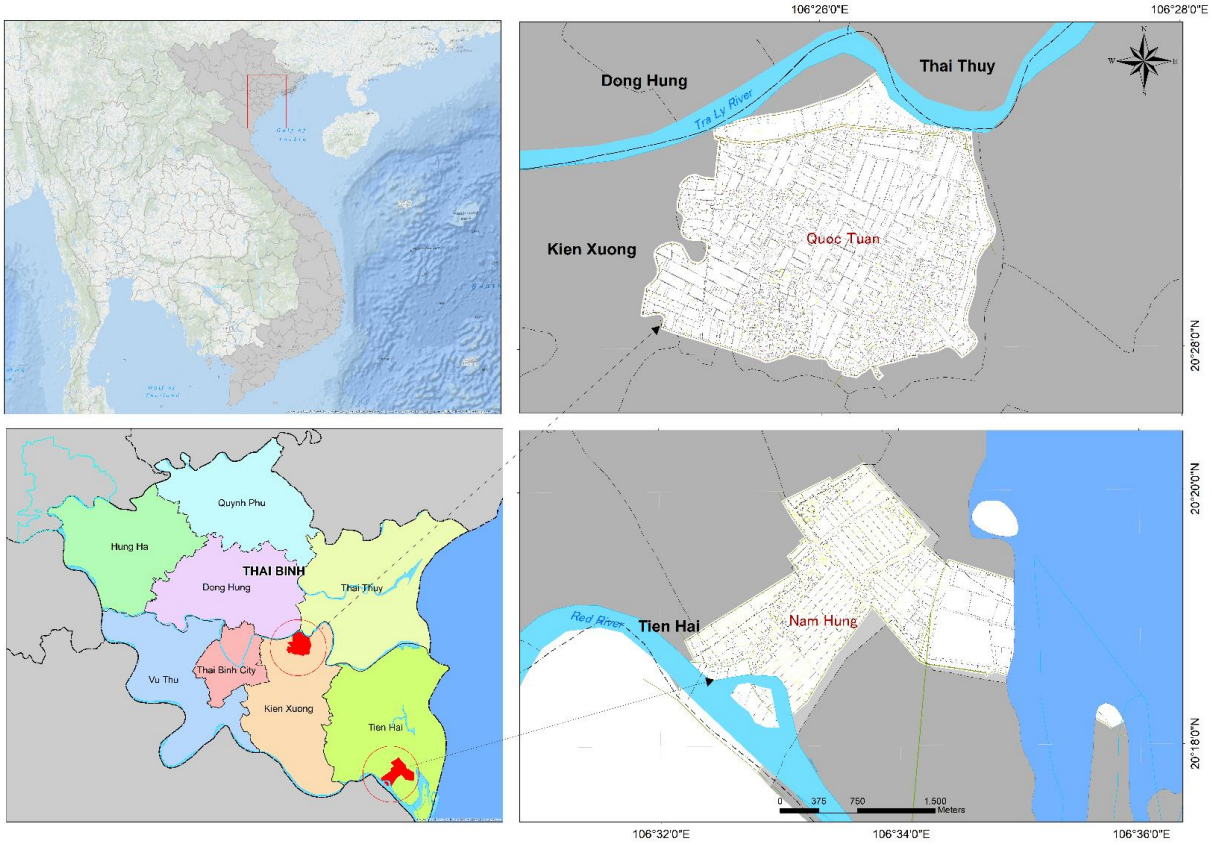


Figure 2: Maps of the study areas in Thai Binh province
Counterclockwise from top left: Thai Binh's location in Vietnam; Thai Binh; Nam Hung community; Quoc Tuan community

Thai Binh's river network is dense, and all rivers flow to the South China Sea. As the province is located in the Red River delta, its hydrological regime relies on the Red River, its tributaries and its tidal system. The tidal system is diurnal with a cycle of 14 days for neap and spring tides. The maximum amplitude is around 3.0 ±0.5 m and the minimum at a neap tide around 0.3 ±0.2 m. Due to the wide variation between these maximum and minimum amplitudes, seawater penetrates significantly up local rivers, 22 km up the Red River and 20 km up the Tra Ly River, for instance. This tidal system is factored into the design and operation of irrigation systems in Thai Binh (DONRE, 2012; Minh, Orange, Thai, Garnier, & Duc, 2014).

Water is not just present in the humid climate and the dense river network; geography and micro-topography are also important factors that significantly influence the magnitude of water-related disasters such as flooding, water scarcity and saltwater intrusion. The terrain is quite low and flat (approximately 0.75 to 2.0 m), which is considered good for wet rice farming. However, the coastal areas are at higher elevations due to sediment accretion processes, which causes difficulties in water drainage and uneven irrigation. Thus, we can say that living and working in Thai Binh means to live and work with water.

Because the Red River is one of the eight siltiest rivers in the world, agricultural production has a long history in Thai Binh. Agricultural production is considered the main sector for economic and social development for Thai Binh residents. Eighty five percent of Thai Binh residents are rural, and the province's population density is around 1,192 people per km^2 (DONRE, 2013). Around 58% of labour is in relation to agricultural production (Thai Binh Statistics Office, 2011). Development of agricultural production and other related industries is therefore a political and economic objective of the People's Committee of Thai Binh province.

Rice farming is the major source of livelihood in Thai Binh. Cultivation, which is constituted by two main rice crops and one cash crop, makes up approximately 60% of the GDP within the agricultural sector (DARD, 2011b). It also occupies 85% of the land under agricultural production (Thai Binh Statistics Office, 2016). Local farmers also spend a large proportion of their working time on rice-farming activities. With intensive application of provincial policies and related development programmes, Thai Binh became the first province to produce up to five tons of rice per hectare-field per year in the late 1960s in North Vietnam,

while neighbouring provinces only achieving four tons. This has earned the province the nickname *Quê lúa*/"the homeland of rice".

Despite this importance, for many households in rural areas rice production is not the main source of income (People's Committee of Nam Hung Commune, 2016; People's Committee of Quoc Tuan Commune, 2016). To improve household conditions many farmers are now seeking other livelihood sources (Le Trinh Hai et al., 2015; Tran Cong Thang, Do Lien Huong, & Le Nguyet Minh, 2013). There are not many local young people working as farmers in their homeland; instead they tend to be factory workers or labour migrants. Elders are therefore taking responsibility for farming activities. Apart from their two main annual rice crops and perhaps a cash crop in particular areas, "domestic" labourers who are not capable of migrating to bigger cities participate in many other agricultural activities: breeding animals such as water buffalos, cows, pigs, chickens and ducks, or cultivating various vegetables in their gardens. Household fish ponds are also very familiar in Thai Binh's rural areas: most people have at least one fish pond attached to their house. Many people living close to the big rivers also fish for supplemental income and food. In coastal areas, aquaculture also contributes to household income, including farming shrimp and fish, collecting aquatic species in the mangrove areas and coastal fishing. In addition to these livelihood strategies, there are other domestic services and local handicraft work undertaken in many communities, diversifying livelihood resources for the locals and maintaining their rural lives. Such activities contribute significantly to the locals' daily lives, not only by supplying income sources, as locals can sell items in the markets, but also by proving extra food sources for their families.

Locals are thus influenced significantly by the general geographical characteristics of the area in terms of their cultural and social lives. The dense river network, coastal location and richness of sediments bring both advantages and disadvantages, requiring the people of Thai Binh to build up their diverse agricultural cultures. Despite the diversity of lifestyles, ethnicity is not very diverse in Thai Binh. I myself was a Thai Binh resident until I was 18 years old, and I never met anyone who did not belong to the Kinh group, the major ethnicity that constitutes 85.73% of Vietnam's total population (UNFPA, 2011) . The main religion is a form of folk religion influenced strongly by Buddhism. Locals, including my family, follow traditions worshipping spirits/gods that have generative powers; these can be nature deities, national or cultural heroes, kin deities or ancestral gods. These beliefs and various rituals and customs

are formed and interwoven with the characteristics of local geographical conditions and agricultural production (Nguyen Thi Hong Thuan, 2017).

For a thorough and specific understanding of local context within the time constraints of a PhD project, I thus focus on two case study communities in Thai Binh, namely Nam Hung and Quoc Tuan. Quoc Tuan (Figure 2, top left) is a riparian area next to the Tra Ly River. The land elevation in this community is one of the lowest areas in Thai Binh province (Division of Agriculture and Rural Development of Kien Xuong District, 2008). These specific geographical conditions inform particular local farming activities in Quoc Tuan. Figure 2 (bottom left) shows Nam Hung, a coastal community located in the far south-east of Thai Binh province. Local residents' lives in Nam Hung are affected by notable water-related issues such as saltwater intrusion, storms, floods and fresh-water scarcity. The public infrastructure is also dilapidated and outdated. DONRE (2012) has ranked Nam Hung as one of the most vulnerable communities in Thai Binh province. In choosing these two communities, my intention is not to compare them but rather to convey and explore the diversity and multiplicity of the effects of governmental climate change adaptation interventions in Thai Binh province.

In summary, this section has described the physical and social geography of the study area including land use, water resources, climate conditions, the current population and its sociocultural characteristics that formed political policies. These basic facts make plain why Thai Binh needs to implement current government adaptation interventions, and what and how their effects influence locals' lives.

1.3. Rice production in the provincial context

Because rice is so important in climate change adaptation in Thai Binh, this thesis will require a bit more knowledge about the ins and outs of rice production in Vietnam generally and in Thai Binh particularly. Rice production is very complicated and complex, with many actors and factors involved in and influencing rice growth phases, yield, farming activities and other needs and supports. The first Vietnamese proverb in the epigraph of this chapter illustrates four main elements for rice production, of which water is considered as the first priority. I focus on water management for rice production in keeping with the scope of PhD project. This section offers a brief summary of rice growth phases and the associated water management. Later these are explained in terms of water-related issues and interventions under the context of climate change in Thai Binh.

Rice growth phases

Rice plants in Vietnam mostly are short-duration or medium-duration varieties due to the tropical climate. There are three phases of rice growth, indicated in Figure 3. First, the vegetative phase, generally around 65 days, extends from germination through to maximum tillering. The second phase, the reproductive phase, takes around 35 days. The third and last phase, the ripening phase, takes around 30 days to go from the milky stage to the final maturity stage (International Rice Research Institute, n.d.). Rice growth depends primarily on natural conditions, which means that rice farming is a nature-based form of livelihood.

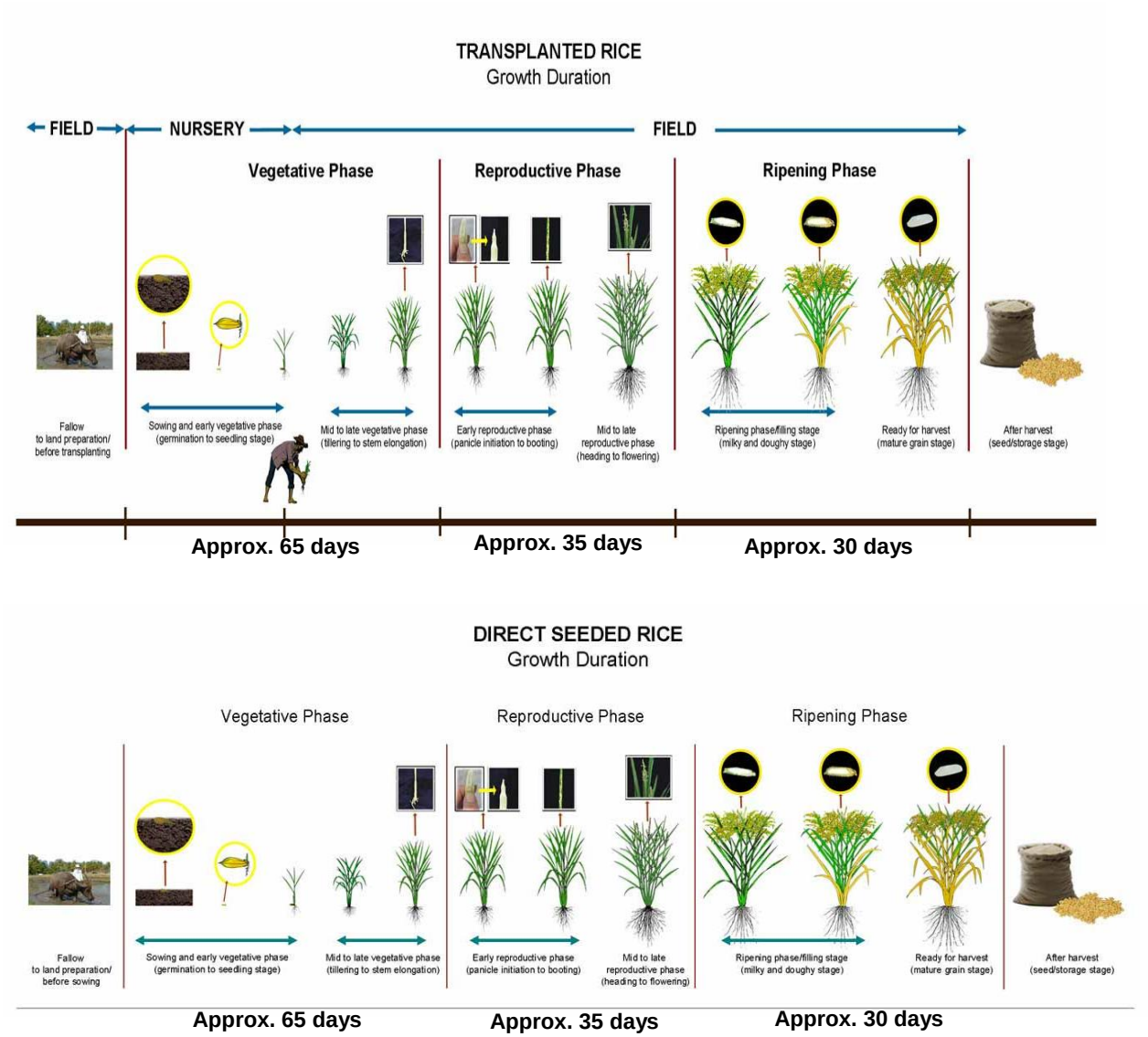


Figure 3: Growth duration of wet-rice plants associated with transplanting (top) and direct seeding (bottom)
(International Rice Research Institute, n.d.)

Two rice-farming practices are applied currently in Thai Binh: transplanting and direct seeding. Figure 3 shows the difference between these two practices at the vegetative phase. In the transplanting practice (top part of Figure 3), the germinated seeds are grown in nurseries to the seedling stage, when rice plants are around ten centimetres tall and have five to seven young leaves depending on the variety of rice. The seedlings are then transplanted into well-puddled fields, with two or three seedlings in one hole (Nguyen Dinh Giao, Nguyen Thien Huyen, Nguyen Huu Te, & Ha Cong Vuong, 2001, p. 41). For the direct seeding practice, germinated seeds are spread directly into well-puddled fields (bottom part of Figure 3).

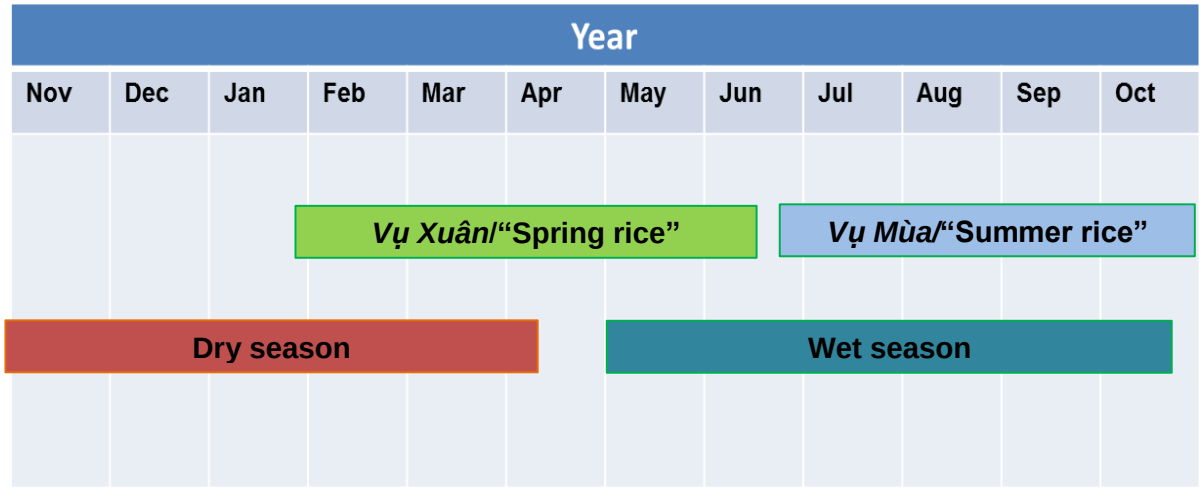


Figure 4: Rice crops and seasons in Thai Binh
(DONRE, 2012; Nguyen Dinh Giao et al., 2001)

Rice crops are also determined by seasons. Figure 4 illustrates time scales for the two main rice crops in Thai Binh, known as *Vụ Xuân*/"Spring rice" and *Vụ Mùa*/"Summer rice". The *Vụ Xuân* usually starts in late January or early February depending on specific weather conditions and water availability. This crop is associated with natural risks such as dry and cold weather, saltwater intrusion and water scarcity. The *Vụ Mùa* usually starts in late June or early July. Flood and storms are the biggest issues for the *Vụ Mùa*. As different weather conditions affect *Vụ Xuân* and *Vụ Mùa*, different farming techniques are applied to protect rice plants and ensure crop productivity, particularly in relation to irrigation management.

Water management for rice production

In a process known as wet-rice civilisation, there is no doubt as to the important role of water. Not only is it the major element for the rice plant's parts, it is also a necessary component for progressing biophysical growth stages, and for the vitality of the surrounding

environment (Nguyen Dinh Giao et al., 2001). The whole process of water management for rice farming is complex, and many influencing factors need to be taken into consideration: rice growth stages, weather conditions, soil conditions, irrigation systems and relevant government plans and calendars. The Vietnamese proverbs in this chapter's epigraph allude to the core principles in rice farming activities for local farmers, prioritising water as the first and foremost.

Water requirements change at the varying growth stages in the paddy fields. Figure 5 illustrates the general water requirement. Specific requirements depend on seasons and microclimates in particular areas. Inadequate water in terms of quality or quantity at critical times in the rice growth cycle may lead to adverse impacts on the final crop mass. For example, if paddy fields are dry for three days before rice plants begin flowering in the reproductive phase, there is a significant reduction in crop productivity. In contrast, excessive water at the tillering stage impairs and decreases the photosynthetic process of the leaf surface, which can deteriorate plant tolerance and final yield (Yoshida, 1981).

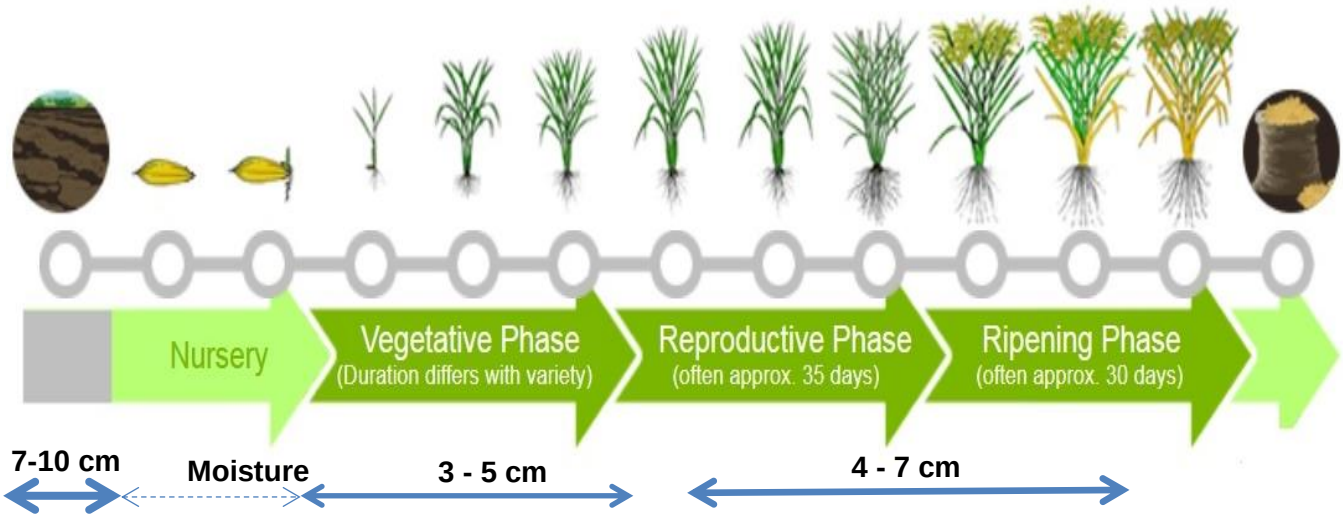


Figure 5: Growth duration of wet-rice plants with water requirements in the field (water scale is in cm from soil surface level) (MOST, 2011)

Water is not only critical for rice growth phases but also very important for other needs. Water is also important for regulating the surrounding environment for the rice plants, for example cooling them down in the summer when the air temperature is above 35°C. Water quality and quantity directly affect soil fertility and texture, pest epidemics and weed development (MOST, 2011). Two different techniques for land preparation in terms of water

availability are associated with *Vụ Xuân* and *Vụ Mùa*. For *Vụ Xuân*/"Spring rice", the soil is ploughed and exposed, allowing drying and loosening, an activity farmers call *"phơi ải*". This plough-loosened soil is then soaked under 10 cm of fresh water for four to six days, then this water will be drained out, in order to wipe out all land toxins and harmful microorganisms and parasites that adversely affect structures and components of the land, then the quality of rice production. In addition, saline and acid sulphate soil are common-place in coastal areas of Thai Binh (Nguyen Van Dao, 2013). There are additional activities and processes for land preparation for these types of soils for rice cultivation. Local farmers often need to repeat this activity three times in Nam Hung, which is coastal, and at least once in Quoc Tuan, which is riparian. This process is crucial to ensure the success of crops for coastal areas (MOST, 2011).

For *Vụ Mùa*/"Summer rice", the interval between the two main crops is very short—three to four weeks—so land preparation is based on techniques for packed soil (*đất dầm*). In many cases, farmers even have only two weeks or shorter period of time for this activity. Soil is ploughed and then immediately flooded to a water level of 10 cm. Under the hot weather conditions, this process composts rice roots and remnant plants from the last crop and kills potential pests and insects. Field surfaces covered by water also avoid weed development (MOST, 2011; Nguyen Dinh Giao et al., 2001).

This section has pointed out water requirements according to rice growth phases and other biological needs. In the next section, I turn to current threats in relation to water for rice production under the context of climate change in Thai Binh. This will shed the light on why the Thai Binh government develops and implements water-related CCAIs.

1.4. Water-related issues under the context of climate change

Climate change causes serious water-related issues affecting both rice production and the domestic lives of people in rural areas of Thai Binh. The biggest issue is saltwater intrusion. This often occurs at the start of the *Vụ Xuân*/ "Spring rice" growing period. With average rainfall in spring showing a downward trend, lower river flows and high tides cause deep saltwater penetration in all rivers in Thai Binh (DONRE, 2012). For example, in the spring of 2010,

saltwater with a concentration of one part per thousand[5] penetrated further 15km into the Red River than the average salt-water line (DONRE, 2012). According to climate change scenarios, a decrease in dry-season flows is expected at all hydrological stations on the Red River (IMHEN, 2010). The sea level is also expected to rise between 58 and 86 cm by 2100 respectively according to low and high greenhouse gas emission scenarios (MONRE, 2009).

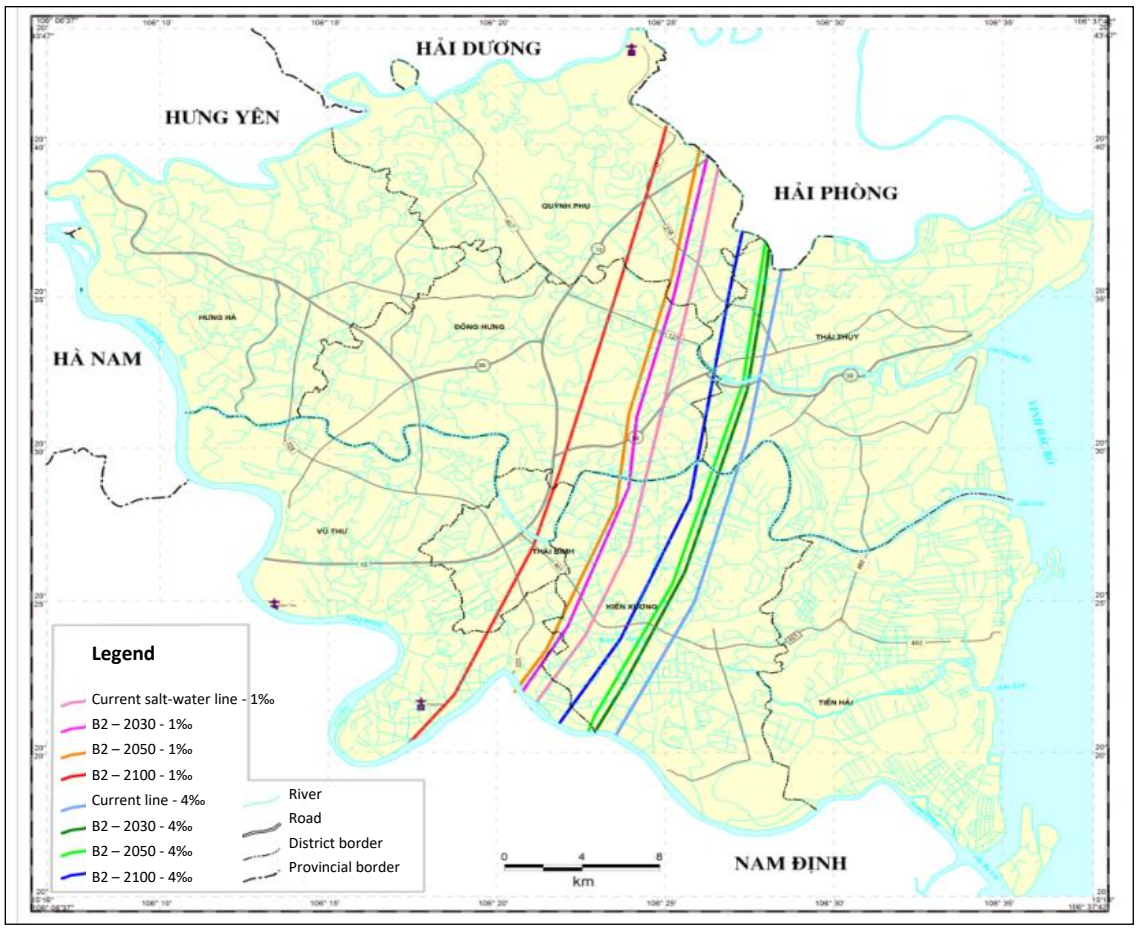


Figure 6: The map of salt-water lines (1‰ and 4 ‰) according to the medium GHGs emission scenario (B2) in 2030, 2050 and 2100
(DONRE, 2012, p. 101)

Figure 6 shows the risk of saltwater intrusion at salt concentrations of both 1 and 4‰ for 2030, 2050 and 2100 according to the medium scenario of greenhouse gas (GHGs) emissions. Saltwater is predicted to penetrate approximately 2.7 km and 2 km past current

5 Parts per thousand or ‰ is the unit used to measure salt concentration, particularly for seawater and brackish water. For rice production, water with a salinity lower than 1‰ can be used for irrigation, even in the early rice growth phases. In contrast, water whose salinity is higher than 4‰ will have a highly detrimental effect on rice plants. Water with a salt concentration between 1 and 4‰ can be used to irrigate when rice plants once they are past the early vegetative phase (Nguyen Dinh Giao et al., 2001).

levels respectively according projections for 1‰ and 4‰ salt concentrations on the Red River in 2050 (DONRE, 2012). Saltwater intrusion is therefore likely to become more serious in the future due to the combination of decreasing dry-season flows, rising sea levels and increasing water demand.

Flooding is also an issue that needs addressing in Thai Binh in the context of climate change. According to climate change scenarios, there is an increasing trend in daily rainfall and number of heavy rain days, even though the annual rainfall is recorded as decreasing (DONRE, 2012). Flood flows are thus predicted to increase up to ten percent in the Red River, and the average seasonal rainfall in the rainy season is also forecasted to increase (IMHEN, 2010). Sea-level rise is another potential factor causing flooding. Due to low land elevation, Table 1 shows that around thirty one percent of the province's land is predicted to be under water if the sea level goes up by one metre (DONRE, 2012). Uneven topography, particularly higher land in the coastal areas, also limits drainage capacity and flood mitigation. It is apparent that these factors will work together and likely lead to high risks of serious flooding. In addition, most irrigation systems in the province were constructed years ago, and the quality and quantity of irrigation facilities are insufficient to withstand the increasingly serious floods and storms associated with climate change. The river water levels are usually three to five metres higher than the land elevation in the rainy season, which can lead to the risk of fifty percent of Thai Binh being under water in the case of failure of river dykes (DARD, 2011a).

Table 1. Ratios of inundation areas based on sea level projections in Thai Binh province (DONRE, 2012).

Sea level rise (cm)	Inundation area (%)
50	11.8%
60	13.9%
70	18.0%
80	22.0%
90	26.5%
100	31.4%

Insufficient water for irrigation and domestic activities is increasingly becoming a concern for local people. A significant growth in the demand for water for agricultural production and domestic activities has been recorded, due to the increase in the number of consecutive dry days and heat events. According to scientific reports and *in situ* data, average

dry season flows in the Red River are currently lower than those of 1956 to 1985 (Nguyen Lan Chau, 2009). There are 10,000 to 12,000 hectares being under-irrigated annually (DONRE, 2012). Importantly, local residents who are not adequately accessing local water supply systems have to cope with the scarcity of fresh water for their domestic activities.

In the previous sections I have provided basic information on Thai Binh demonstrating the complexity of rice production in terms of growth phases, water requirements and current water-related issues that significantly influence rice plants and farming activities. The province's characteristics and its increasing vulnerability have also been laid out. There is no doubt about the need to adapt to water-related issues, particularly for the "homeland of rice". The next sections therefore focus on how CCAIs in general as well as those for water-related issues have been developed and implemented, offering a rich description of what Thai Binh does to support its people to adapt to climate change impacts, and how it achieves that.

1.5. Climate change adaptation interventions

It is certain that different kinds of interventions have been implemented particularly at the local level. However, as a starting point for getting to know the effects of CCAIs, this chapter thus only focuses on formal interventions, indeed government-led intervention either for agriculture production of other local needs. In this section, I thus only focus on these kinds of formal interventions and as a normative and standard evaluator and researcher would in doing this research. As a result, the culture of doing government-led CCAIs in Vietnam have thus been characterized (Other kinds of interventions that take the locals and even other entities into account, or non-formal interventions, will be clarified later in the chapter 5 and chapter 6).

Climate change adaptation interventions in Vietnam

Vietnam is considered a country that is doing well in climate change adaptation (Gass, Hove, & Parry, 2011). It has relatively complete administrative systems in the development, implementation and management of its CCAIs. Figure 7 illustrates how different agencies take part in institutional systems and implementation practices in aspects of climate change adaptation.

The Vietnamese government and its ministries is responsible for developing and implementing key policies and strategies such as the National Climate Change Strategy (Prime Minister of Vietnam, 2011b), National Target Program to respond to climate change (Prime Minister of Vietnam, 2012), and the National Action Plan on climate change for the period 2012–2020 (Prime Minister of Vietnam, 2012). Lower institutional agencies develop action plans to respond to climate change for their administrative areas at the provincial and district levels. They also work as navigators and translators for detailed CCAIs within their administrative areas.

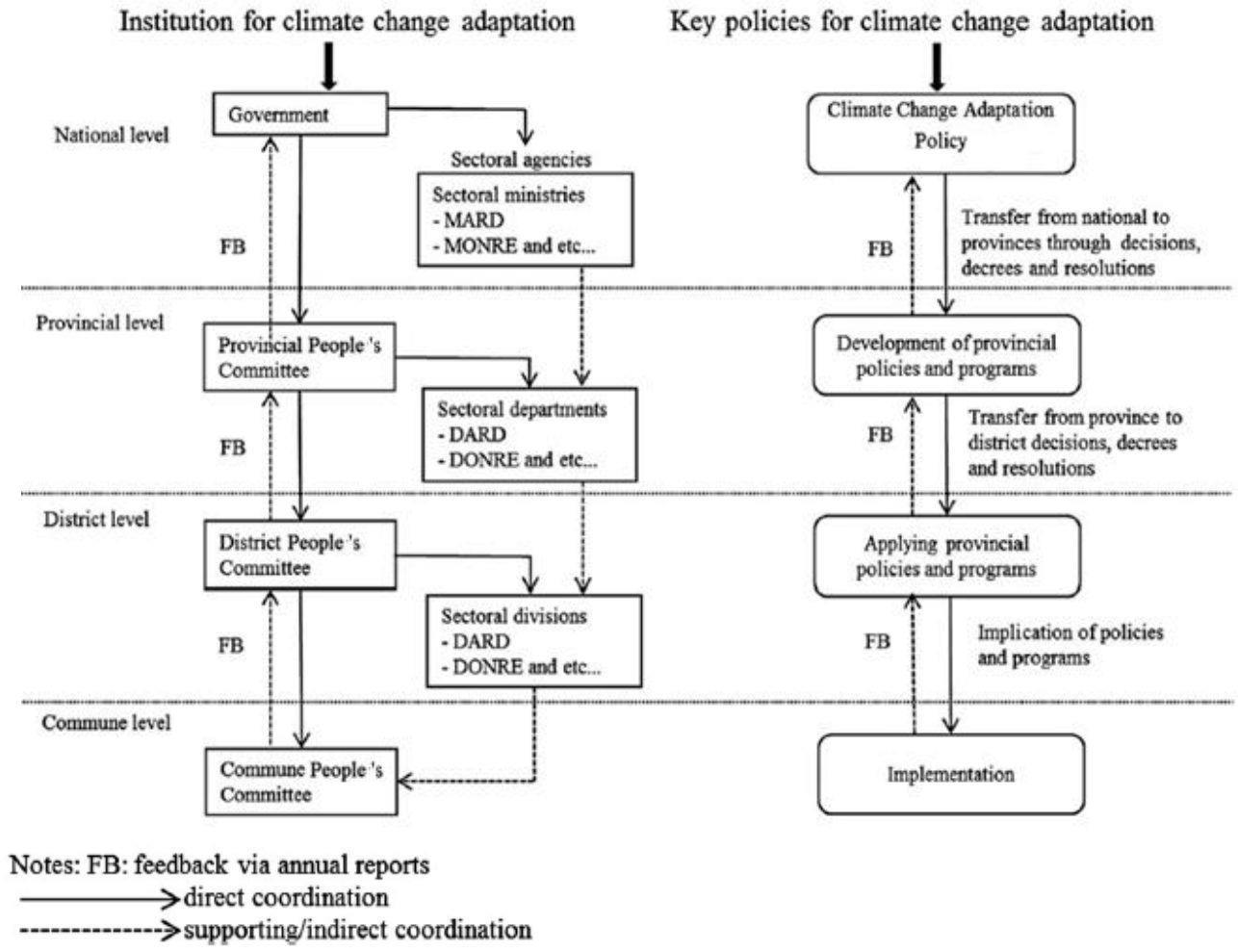


Figure 7: Hierarchical multilevel system for climate change adaptation in Vietnam
(adapted from Phuong et al., 2018)

Along with the passing of decision-making from the national to local level, the dashed lines in Figure 7 show feedback from lower agencies to higher ones through annual meetings, workshops and reports in both institutional management and implementation of particular CCAIs (Phuong, Biesbroek, & Wals, 2018). Theoretically, these systems should reflect and

combine both the top-down approach and local participation in doing CCAIs. However, there is no doubt that in practice, the autocratic one-party system, policies, strategies and measures in terms of climate change in Vietnam follow only top-down and technocratic management (Phuong et al., 2018; Trinh Thi Thanh Binh, 2016).

Significantly, policy makers consider climate change adaptation as an opportunity for country development. Knaepen (2014) argues that integrating climate change adaptation into general development programmes is considered a "new policy arrangement" in Vietnam. In the national climate change strategy, for example, the Prime Minister of Vietnam (2011b) states clearly in one of six guiding principles:

> Responding to climate change must be associated with sustainable development toward a low-carbon economy, taking advantage of opportunities to change development thinking, increase competitiveness and strengthen national power. (p.4)

There are even particular regulations and indicators in choosing the interventions that can be funded through particular budgets, including both national and international sources. The Prime Minister of Vietnam (2011a) has issued specific criteria for the projects that can access funding from the Support Program to Respond to Climate Change in Vietnam (SP-RCC).[6]

According to this decision, the list of prioritised projects included projects for reforestation for upstream land and mangrove areas, construction of infrastructure and more effective and efficient management of natural resources, as well as projects that support both economic and social development in response to climate change. It is clear that there is a strong focus on mainstreaming climate change information into existing development programmes and applying climate change adaptation for development purposes. Therefore, it is unnecessary to clarify which are CCAIs, which are "business as usual" development programmes, and which are natural disaster risk-management strategies. This adaptation

[6] This programme, established in 2009, has a large international budget contributed to by many big aid agencies, including the Japanese International Cooperation Agency, Australian Department of Foreign Affairs and Trade, Agence Française de Développement, Export–Import Bank of Korea and World Bank. These financial partners provide annual support to the Vietnam government of around US$240 million for climate-change response (Prime Minister of Vietnam, 2014).

perspective strongly favours “hard”’ infrastructure solutions and a top-down approach. Lindegaard (2013) argues that this infrastructure bias is leading to other “soft” solutions being overlooked. Similarly, Radhakrishnan et al. (2017) criticise this as “tradition engineering” or a singular adaptation perspective for the loss of flexibility in doing CCAIs in Vietnam.

There are many other factors and actors affecting doing CCAIs in Vietnam. The introduction has pointed out the impacts of people, particularly the cultures and political interests of scientists, among others, in breeding misunderstanding and misrecognition of climate change impacts and governmental adaptation interventions (Zink, 2013). Similarly, Buch-Hansen et al. (2013) state that doing CCA in Vietnam is to deal with paradoxes in economic growth and socioeconomic differentiation. For example, the rich are more concerned about climate change due to their fragile climate-dependent livelihoods such as acacia plantations and shrimp farming, even though they own multiple-storey concrete houses that protect them better during disasters than the houses of the poor. The poor feel threatened by extreme climate events due to their brick houses; however, they are more concerned about access to land and employment than climate change impacts.

Nguyen Quynh Anh, Miller, Bowen, and Bach Tan Sinh (2017) point out some of the barriers in both establishing and implementing CCAIs at the national level in Vietnam. The national policies are relatively ambitious, and there is a lack of clarity about actual vulnerability and adaptive capacity, as well as weak cooperation between existing governance and institutional arrangements. Having worked as a researcher in Vietnam and participated in the development of two national legal documents on climate change adaptation, as well as being a leading consultant for the Thai Binh action plan, I admit that the barriers mentioned in the work of Nguyen Quynh Anh et al. (2017) are even worse than they described. At the provincial level, Nguyen Phuong Nam et al. (2015) reviewed provincial action plans and found that only 3 out of the 24 were “relatively good” plans.

By exposing the process of how the Vietnamese government develops and implements CCAIs to support its locals, this section has outlined briefly the general culture and perspective with respect to adaptation in Vietnam. Indeed, this perspective and approach is applied across the country and at multiple levels from national to grassroots. In the next section, I move to detailing how Thai Binh province attempts to adapt to water-related issues, particularly for rice production.

Water-related climate change adaptation interventions in Thai Binh

The interventions for agriculture production

The agriculture sector, being dominantly wet-rice production, accounts for around 82% of total water use in Vietnam (Can Tho University, 2011). There is also long history of interventions in relation to irrigation, particularly in the Red River delta, including Thai Binh province. In this chapter's epigraph, the second Vietnamese proverb illustrates the will of government and local farmers in actively ensuring water for their rice farming.

Thai Binh being the "homeland of rice", its main climate change policy—that is, Thai Binh's provincial action plan to respond to climate change—mainly focuses on water-related issues, including saltwater intrusion, flooding and the lack of fresh water for irrigation and domestic activities in the dry season (DONRE, 2012). In this thesis, interventions for adapting to these water-related circumstances are considered water-related CCAIs. These water-related CCAIs focus primarily on improving infrastructure for irrigation, drainage and water supply systems. At the local commune level, there are also various interventions funded by NGOs and others that support local residents to adapt to water-related issues. For example, in Nam Hung, the Centre for Marine Life Conservation and Community Development (MCD) has helped local residents adapt to saltwater intrusion, storms and lack of fresh water for domestic and agricultural demand (MCD, 2012). However, there are currently not many of these kinds of interventions in the province, and they are often implemented in a short time frame.

In short, the two main kinds of water-related CCAIs for rice production are infrastructure improvement and management plans and policies. I will deal with these in turn.

Infrastructure programmes in relation to water-related issues

In Thai Binh, sufficient water for rice farming depends heavily on irrigation systems. These include dyke, canal and river systems and other irrigation facilities. Dyke systems for the Red River and the sea have been in use since the Ly Dynasty in the twelfth century. However, the dyke systems for the Red River and its main tributaries as well as for coastlines were only completed in the 1900s with the support of the French colonial government. Since then, under both French colonisation (1890–1954) and the subsequent Vietnam communist

government, there has been a long and consistent focus on the development of dyke systems and canals. Apart from the Red River and its natural tributaries crossing Thai Binh, there are many human-made rivers, canals and other irrigation infrastructure that supports the two annual rice crops, with an extra cash crop in some areas (Devienne, 2013; Fontenelle, Molle, & Turral, 2007; Nguyen Quang An & Nguyen Thanh, 2006).

Following the 6th National Party Congress in 1986, the economic reform *Đổi mới*/"Renovation"[7] paved the way for many national strategies of industrialisation and modernisation for rural areas. Many new infrastructure programmes have been implemented across the country. For example, many dams have been built in upstream areas in the Red River delta in order to generate electricity, and expectedly control flooding and reduce the risk of saltwater intrusion and water scarcity for downstream areas. There are also infrastructure programmes focusing on improving, constructing and maintaining irrigation and drainage facilities (Ritzema et al., 2008). They are funded annually and are under the control of particular government agencies.

At every local community, much of this infrastructure is commissioned under the New Rural Programme (NRP). This programme carries out many small projects to improve in-field infrastructure, including canalisation and other irrigation and drainage facilities. The NRP is also positioned as supporting water-related climate change adaptation interventions. Successful implementation of this programme is also a political goal for all rural communities across Vietnam, and local officials will do whatever they can to achieve these goals. The programme's focus on infrastructure is not new in terms of rice production. However, the current continuation of this programme is a clear manifestation of technocratic, colonial and modernist culture in doing climate change adaptation by the Vietnamese government including lower agencies in Thai Binh. This again confirms "infrastructure bias" by Lindegaard (2013) or "traditional engineering" by Radhakrishnan et al. (2017).

7 *Đổi mới*/"Renovation" is an economic reform programme whereby the Vietnamese government shifted from a planned economy to a socialist market-oriented economy. This policy marked great economic growth and social change across the whole country (Boothroyd & Pham, 2000).

Management plans and policies

Water for rice farming is affected by not only infrastructure programs but also the *Dồn điền đổi thửa*/"Land Consolidation Plan" and other regular administrative procedures (Bui Quang Dung, Nguyen Trung Kien, Bui Hai Yen, & Hau, 2015). This section aims to reveal how the Vietnamese government tries to operate and manage its infrastructure and other sources for better rice production under a climate change context, particularly in the province of Thai Binh.

The *Dồn điền đổi thửa* is an agricultural land policy that aims to enhance effectiveness and efficiency in farming activities. Policies for agricultural land in Vietnam have long been inconsistent, varying in the north and south because of the history of the Vietnam Wars. These land policies directly affected water management for farming. Particularly, before 1988, all local agricultural land and other tools were under the control of the state; local farmers were workers in *Hợp tác xã*/ "Agricultural cooperatives". With the *Khoán mười*/"Directive 10" in 1988 and Land Law in 1993, farmers gained rights to their paddy fields (Marsh & MacAulay, 2002). However, in order to ensure equity in terms of quantity and quality of farming land, each household was allocated many fragmented individual plots with varying soil characteristics and distances to their houses. Some individual plots were as small as around 0.3 sào.[8] This resulted in low crop productivity and longer agricultural time, costs and labour. For rural industrialisation and modernisation, the Vietnamese government has implemented the *Dồn điền đổi thửa* since 2001. Instead of farming many small plots, each household now farms one or two larger plots (Marsh, MacAulay, & Hung, 2006; Tran Viet Dung, Nguyen Xuan Thinh, & Tuan, 2014). Figure 8 illustrates how household farming land was redistributed from many fragmented individual plots into larger ones. In addition, the infrastructure programmes and the NRP have ensured that each household's paddy field is now connected directly to local canals. This change has significantly affected local farming behaviours and crop productivity (Bui Quang Dung et al., 2015; Marsh et al., 2006; Pham Thanh Que, Nguyen Ba Long, & Oanh, 2014; Tran Viet Dung et al., 2014).

8 One sào is equal to 360 m^2 in the north of Vietnam.

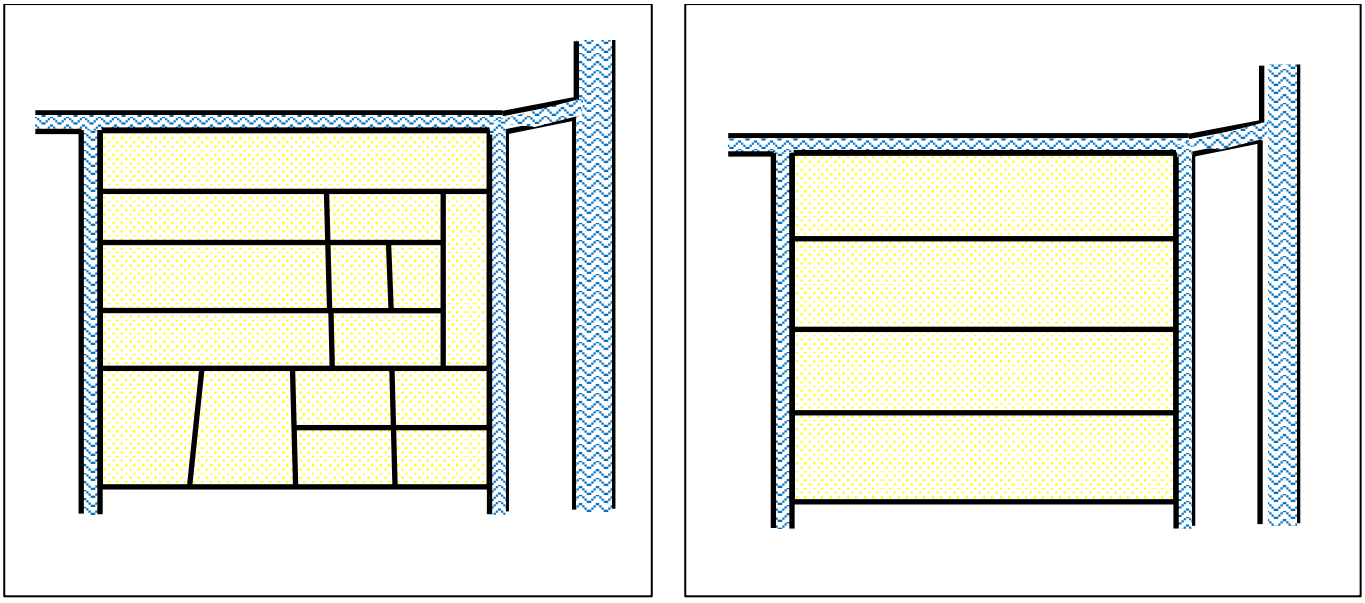


Figure 8: Example of individual plots before (left) and after (right) the Land Consolidation Plan on one farm (Tran Viet Dung et al., 2014, p. 22)

Besides national policies like the *Dồn điền đổi thử*a, there are also regular administrative procedures in the form of irrigation plans and cultivation calendars. They play an essential role in ensuring the success of rice production. Irrigation plans are used to arrange specific times for irrigating and draining in particular areas. Cultivation calendars set out specific periods for the navigation of agricultural activities according to rice growth phases, climate forecast and other predictable factors. Local cultivation calendars indicate, for example, specific dates for preparing land, spreading germinated seeds and transplanting seedlings. There is a need for negotiation and harmonisation between these two procedures and the strategies of other water users, such as for electricity production and marine transportation, to ensure security and socioeconomic development for the Red River delta in general and Thai Binh in particular.

There is a consistent “grand scheme” based on both hydraulic and administrative boundaries in the Red River delta (which covers a network of 30 hydraulic compartments or polders[9]), in order to ensure sufficient water for irrigation purposes and drainage, as well as effective flood control in both the rainy and dry seasons. Figure 9 shows that the Thai Binh irrigation network comprises two compartments, No 6 to the north and No 7 to the south. These

[9] The term of “polder” is used for an area where water is allocated and managed by closed systems of sea and river dykes and other facilities.

two compartments are subdivided into many sub-compartments depending on administrative boundaries and particular geographical conditions.

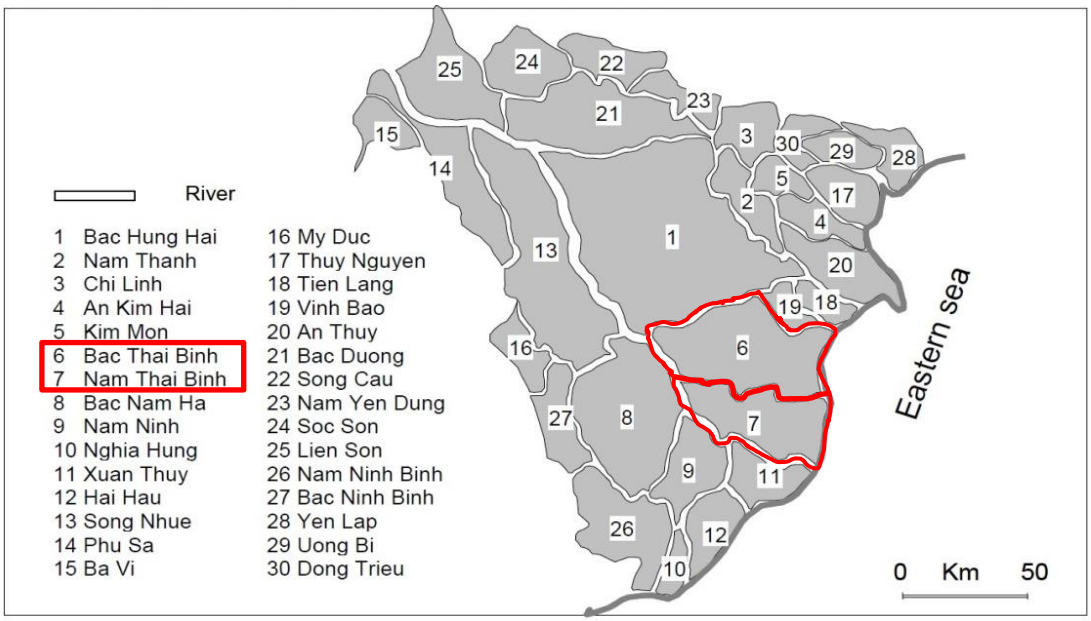


Figure 9: Schematisation of hydraulic compartments in the Red River delta
(Devienne, 2013, p. 268)

There are seven administrative organisational units involved in this grand scheme, illustrated in Figure 10. From the bottom, first is the local household field. These fall within the control of the agricultural cooperative (*Hợp tác xã). Hợp tác xã* in turn is under the control of the Infra District Irrigation and Drainage Management Company (*Cụm thủy nông*), which falls under the district-level District Irrigation and Drainage Management Companies (DIDMC - *Xí nghiệp khai thác công trình thủy lợi huyện*). There are seven districts and one city in Thai Binh; these are associated with eight DIDMCs, which fall under the north and south IDMCs. These two IDMCs fall within the Thai Binh Department of Agriculture and Rural Development (DARD), which must follow the direction of the Ministry of Agriculture and Rural Development (MARD).

Each administrative level is related to a particular level of hydraulic compartment and administrative boundary, which determines its particular tasks, duties and rights in operation. This means, for example, that at agricultural cooperative level, local authorities can only manage and operate specific facilities such as local sluices and canals which can only allocate water within their local administrative community boundary. Of course, there may be other

facilities installed in a particular community, but if they are involved in water management for larger areas, they will be controlled by higher organisations such as *Cụm.*

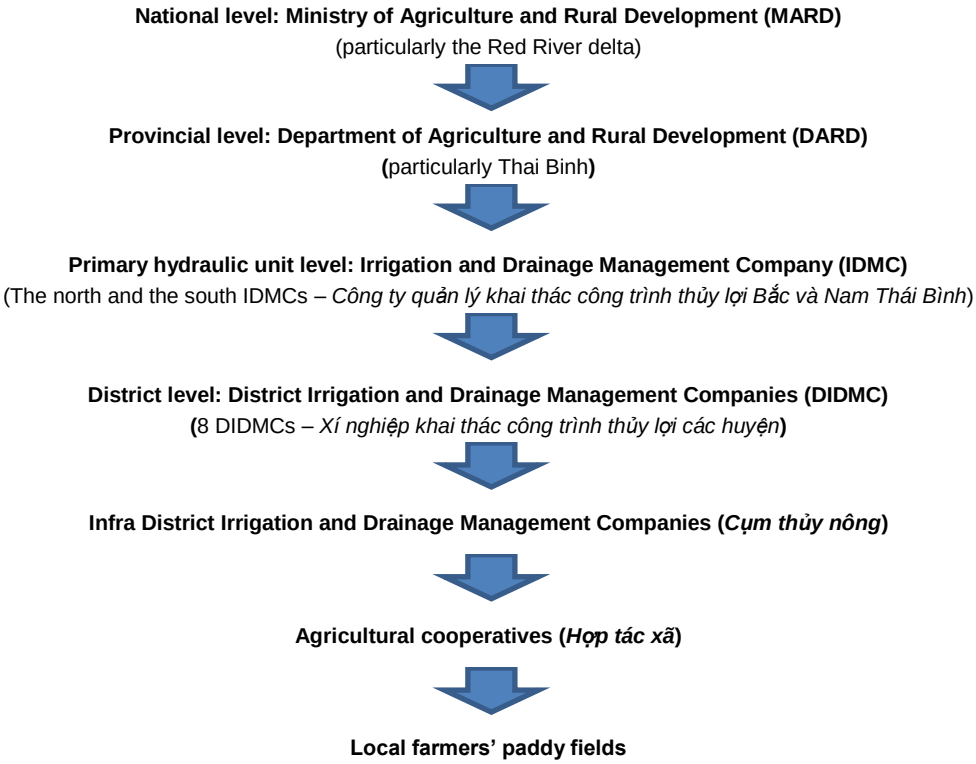


Figure 10: Framework for administrative units of water management in the Red River delta (adapted from Fontenelle, 2001)

Currently, this scheme is officially considered a decentralised system (Fontenelle et al., 2007); however, actual water management practices are mostly centralised and top-down. There is collective decision-making in controlling water only at the agricultural cooperative level (the second tier from the bottom in Figure 10). This means that local farmers can contribute to their local water management based on specific and actual conditions. There may sometimes have negotiations at the *Cụm* level, meaning that communities belonging to the same *Cụm* can compromise for better water management in their areas (Devienne, 2013; Fontenelle, 2001; Fontenelle et al., 2007; Nguyen Thi Xuan Lan, 2010).

Strictly following this hierarchical scheme, upstream reservoirs provide water for irrigation requirements for *Vụ Xuân* in downstream areas at three important periods during the dry season in January and February (see Figure 11). These water releases are based on a lot of scientific data, such as long-term precipitation forecasts upstream, water levels, water use,

economic plans in terms of electricity production, and regional agricultural production. Lower administrative units then set up their own irrigation and cultivation plans. Explained in terms of hydraulic balance, upstream reservoirs first release water at specific times. Then outlet sluices at coastal lines are closed to store this water in the rivers in particular downstream areas. This allows water levels in the rivers to be higher than the elevation of the paddy fields, allowing irrigation into the fields via gravity and also ensuring enough water for particular "closed" areas. This operation allows compartments and sub-compartments to control water in turns by managing intake gates, control gates and outlet sluices (Dang The Phong, 2004; Devienne, 2013). Each administrative unit has its turn for accessing water (Fontenelle, 2001; MONRE, 2015; Nguyen Lan Chau, 2009).

In addition, Thai Binh is a coastal province, tides are also important for water irrigation, especially in the dry season. During spring tides, saltwater is pushed up the rivers, heightening their water levels. In particular periods and areas, the surface water is fresh, and local hydraulic units make use of these valuable periods for irrigation (Dang The Phong, 2004; Nguyen Van Hoang, Nguyen Thanh Cong, & Ung Quoc Khang, 2014).

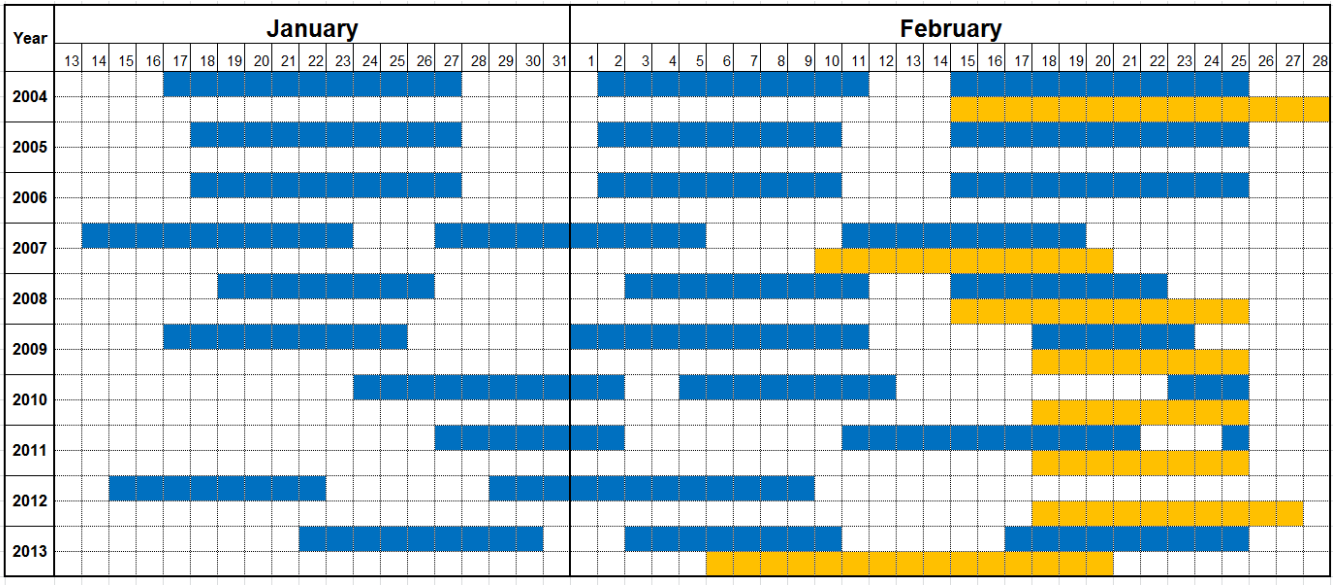


Figure 11: Timeframe for providing water for irrigation demand from the reservoirs and for farmers to transplant and directly seed during *Vụ Xuân*, 2004–2013, in the lower Red River (adapted from MONRE, 2015)

In the rainy season, it is very complicated and laborious to carry out appropriate water management. Despite intensive and consistent efforts, there are still many serious flooding incidents that lead to high death tolls and property loss in the Red River delta (Hansson & Ekenberg, 2002; IMHEN, 2010). To limit losses due to floods and storms, the administrative units and irrigation infrastructure must follow strict top-down directives in particular circumstances. They also cooperate with other hierarchical administrative structures and comply with national legal documents such as the Ordinance on Prevention and Control of Floods and Storms (1993) and the acquisition of land for emergencies due to natural disasters under the Law on Land (2003), among many more (Jain & Trang, 2012). Preventative activities are mostly the responsibility of government agencies. There are collective actions at the grassroots level, but these often come together after flood incidents. This means that the operation of irrigation facilities during flood incidents wholly depends on specific governmental agencies.

The voices of local communities in flood mitigation have been largely ignored (Jain & Trang, 2012). Officially, there is a local steering panel that is responsible for making plans for natural disaster prevention and control and responding during and after every flood and storm at local community level. The panel consists of members of various local governmental agencies and public organisations (e.g., farmers' union, youth union, women's union, veterans' union, Fatherland Front). With such members these panel seem to be based on local participation, but it fact they rely on a top-down management system under the patronage of higher administrative levels. Recommendations from ordinary residents are not likely to be received in practice (MCD, 2012). Local residents are therefore responsible for only their own households' property and paddy fields. It is impossible for local farmers to drain floodwater themselves, even in minor floods. They are completely dependent on the operation of the network, which is based on a grand-scale decision-making structure at the national, regional and local agricultural cooperative levels (Devienne, 2013; Hansson & Ekenberg, 2002; Jain & Trang, 2012).

This section details how Thai Binh province, which is part of the higher administrative system, carries out its water-related CCAIs. These interventions are vital for local farming activities and as well as the main subject of the thesis. The following chapter will explore how these CCAIs perform and affect local livelihoods.

Interventions for domestic water-related issues

There are four sources for local domestic water including rainwater, shallow groundwater, surface water and piped running water. The previous section has pointed out some water-related issues that affect local domestic activities, particularly less rainwater and surface water in the dry seasons and increase of the amount of water requirement. However, these water-related issues also lead to other issues for local daily activities. In particular, lower water levels in local rivers and pond result directly in worse water quality and lower groundwater level in locals' shallow wells. This means that the interventions that support locals in getting enough freshwater in the dry season are also considered CCAIs (DONRE, 2012).

Being highly aware of freshwater scarcity for local domestic activities, the Vietnamese government and Thai Binh province have taken seriously adaptation intervention into account (DONRE, 2012) (Prime Minister of Vietnam, 2000). Many projects and activities funded by both the national budget and foreign loans have been implemented. Thai Binh, in some points, is even considered the best province in supporting its inhabitants in having enough freshwater (Dang Hung, 2018). One of the noticeable interventions in this regard is the National Clean Water Supply and Sanitation Strategy to 2020. Under this strategy, there are two main programmes playing the most important roles in supporting locals. The first one is the National Target Programme (NTP) that aims to ensure sufficient clean water for domestic uses and to address other rural environmental issues. This programme includes funding for local residents for installing certain kinds of domestic water facilities, such as borewells and filter systems. The NTP also issued many regulations and manual guidelines for implementing and monitoring the progress of their activities (MARD, 2012). The second one is the VN-Red River Delta Rural Water Supply and Sanitation Project (ID P077287), and was funded by the World Bank. It was implemented from 2006 to 2013 in the province of Thai Binh and three neighbouring provinces within the Red River delta. The project included the installation of plants and pipes for running water, as well as providing support in the form of financing and teaching new techniques in building good water filter systems, water tanks, sewage systems and sanitary toilets. The project is considered a pioneering intervention in terms of clean water supply and sanitation for rural areas in Vietnam. This project has been replicated many times for other projects funded by the World Bank, other NGOs and the Vietnamese government (World Bank, 2015).

Certainly there are other programmes led by government in supporting locals to adapt to climate change such as mangrove reforestation and local awareness raising for climate change, and etc (DONRE, 2012). However, the main argument of this chapter is to explore what is happening on the ground (for further understanding of local realities in relation to CCAIs) and then to work forwards better adaptation. This section thus only focuses on two kinds of these interventions.

1.6. Conclusion: Questioning the uncertainty and unpredictability of interventionist adaptation: thinking with postdevelopment perspectives

This chapter specifically addresses the first research question: How does Thai Binh province support its people in adapting to climate change in terms of water-related issues? This chapter has first reviewed key facts about my study areas pertaining to the local geography, natural conditions, people, management culture and economy. I then emphasised rice production, the most important livelihood activity for local residents in Thai Binh even though it is not the main source of income. Rice is not only the main source of food, but also long-held traditional livelihood for locals in the agricultural province like Thai Binh. This livelihood has a long history, and both affects and is affected by social-cultural characteristics, political policies, infrastructure and locals' daily lives. Local farming activities are complicated and subject to many factors and actors, for example water availability, natural conditions, seasons, rice growth phases, governmental regulations in irrigation and drainage, and infrastructure.

There are many water-related interventions that have been applied to ensure food security and local development in general, but make no mistake: it is for rice farming that water management is most complex and important. This chapter has reviewed notable water-related CCAIs including infrastructure programmes as well as management plans and policies. The first focuses primarily on canalisation and the improvement of irrigation infrastructure. The latter controls water not only for rice farming requirements but also to ensure security during natural disasters (floods and storms) and for socioeconomic development. These sorts of water-related CCAIs continue a long tradition of water management interventions. They are mainstreamed into, associated with and considered as development programmes in Vietnam and follow a technocratic and rationalist approach toward *Hiện đại hóa ngành nông nghiệp/*"Modernising the agricultural sector". The strictly hierarchical administrative systems

are also determined by external officials, scientists and experts rather than the ultimate beneficiaries—the local farmers.

The management culture of government-led water-related CCAIs as described in this chapter tells us that officials and other related stakeholders are aware of the complexity, uncertainty and unpredictability of climate change impacts on locals' lives. Paradoxically, to deal with these challenges, the Vietnamese government relies heavily on the predictability and rationality determined through scientific models (Fontenelle, 2001; Fontenelle et al., 2007; Knaepen, 2014; Lindegaard, 2013; Miller, forthcoming; Phuong et al., 2018; Radhakrishnan et al., 2017; Tessier, 2013; Trinh Thi Thanh Binh, 2016).

So what then? How we can deal with the limits of our knowledge in this respect? We try our best to predict how climate change and relevant CCAIs will affect us basing ourselves on science and technology, but no matter how hard we try, all this information is just prediction—the results of scientific models and not realities. If we cannot know how well our CCAIs will not work, what are the maladaptations in which they may result, and how can we be more adaptive and flexible in light of ever-present uncertainty and unpredictability? Do we need a "plan B" for our current CCAIs? For this kind of plan B for CCAIs—an "alternative to development"—there is a need for deep and wide understanding of the messy effects of water-related CCAIs, as well as our knowledge with respect to the uncertainty and unpredictability under climate change context. Since better knowing can lead to better doing (Chambers, 2017).

With the above interpretation of the CCAIs and its effects, this chapter has fleshed out contextual background for the next chapter in revealing the mess of current water-related CCAIs. As a result, the performance of interventions and their effects on the ground will be revealed, which can support us as researchers and officials in finding alternatives for CCAIs in the province of Thai Binh.

By focusing merely on government-led intervention or formal adaptation, this chapter is like any common description of developmentalist intervention. However, this initial understanding and struggles of dealing with uncertainty and unpredictability encouraged me to go beyond the mainstream approach in knowing local realities in chapter 2, particularly with the sustainable livelihoods approach (SLA). It is my first step within my journey of experimentation whereby a "development subject" or "product of development" seeks to do something really different as mentioned in the introduction of the thesis.

CHAPTER 2

EXPERIMENTING WITH THE SUSTAINABLE LIVELIHOODS APPROACH FOR KNOWING LOCAL REALITIES

> Any adaptation intervention cannot be stand alone but must go hand in hand with development, as with mainstreaming (‘adaptation plus development’), or even be synonymous with development (‘adaptation as development’).
>
> —(Ayers & Dodman, 2010, p. 165)

2.1. Introduction

Current water-related CCAIs can be seen as technocratic, top-down management and development programmes, as illustrated in the previous chapter. They are over-reliant on predictability, despite our awareness that climate change impacts, relevant interventions and their effects are uncertain and unpredictable. Being aware of the limits and failures of development programmes in general, this chapter thus aims to experiment with a postdevelopment perspective that seeks to unfold the mess of developmentalist CCAIs on the ground. Along with chapter 1, this chapter provides rich and comprehensive knowing on local realities in relation to water-related CCAIs in Thai Binh. This knowing is the first layer mentioned in Figure 1.

The chapter explores local livelihoods in relation to the effects of water-related CCAIs. It first draws on the literature to outline the sustainable livelihoods approach (SLA), which has developed as a key framework and approach in development thinking over recent decades (Batterbury, 2016; De Haan, 2012; McLean, 2015; Scoones, 2009, 2015). However, this chapter does not aim at arguing or developing SLA theory. This is also not about examining local livelihood strategies in order to propose particular and specific alternative livelihood strategies. Rather this chapter examines the effects of water-related CCAIs through the lens of local farmers' livelihoods, in order to know what happens on the ground in more complex and unexpected detail. Through this understanding we might have better chances of finding possibilities for alternatives to developmentalist CCAIs, or a "plan B" to climate change adaptation.

To this end, the chapter outlines the sustainable livelihood approach (SLA) and proposes some amendments that make it more relevant and being critical to the case of livelihoods in Thai Binh Province. The methods by which the SLA was applied are described, before the chapter turns to an interpretation of the effects of CCAIs on local livelihoods in Thai Binh. This is a comprehensive interpretation of the effects of water-related CCAIs on local livelihoods, including desires and hopes or expected benefits, as well as the disappointments and failures of both the Vietnamese government and local farmers in the province of Thai Binh.

2.2. Knowing local realities through the sustainable livelihoods approach

The sustainable livelihoods approach

The sustainable livelihoods approach (SLA) has been widely applied by development scholars and organisations to understand livelihoods in a range of areas such as livestock, fisheries, forestry, agriculture, health and other aspects (Scoones, 2009). The SLA has been used to research, develop and evaluate livelihoods, particularly in developing countries. It is illustrated as a framework for analysis in Figure 12. In introducing the SLA in 1992, Chambers and Conway (1992) suggested that the approach can accommodate the multiplicity and complexity of rural livelihoods. Morse, McNamara, and Acholo (2009) described the SLA as a "practical framework for evidence-based intervention [with] much logic resting behind it" (p.3). The term SLA is used interchangeably with the sustainable livelihood framework (SLF), shown in Figure 13 (DFID, 1999), which also led to the peak application of the approach in research and practice on livelihoods in the early 2000s (Batterbury, 2016; Morse et al., 2009; Scoones, 2009, 2015). I therefore come to apply this approach as one which is mainstream and draws a researcher's attention to a comprehensive set of factors that affect the sustainability of local livelihoods, in this case in relation to the effects of water-related CCAIs in two case-study communities, Nam Hung and Quoc Tuan in Thai Binh Province. This section thus focuses on ascertaining the appropriateness of this approach in my work for interpreting local realities both before and after CCAIs are implemented.

First, I briefly describe the SLA in general. The SLA is concerned with *all* factors and actors that influence how people make their living, attempting to represent all the possibilities in one model. This model consists of five categories: assets, strategies, institutional and policy context, vulnerability context and outcomes. The various arrays of connections between categories and sub-categories represent how these categories and sub-categories interact and influence each other. This complex arrangement requires some explanation.

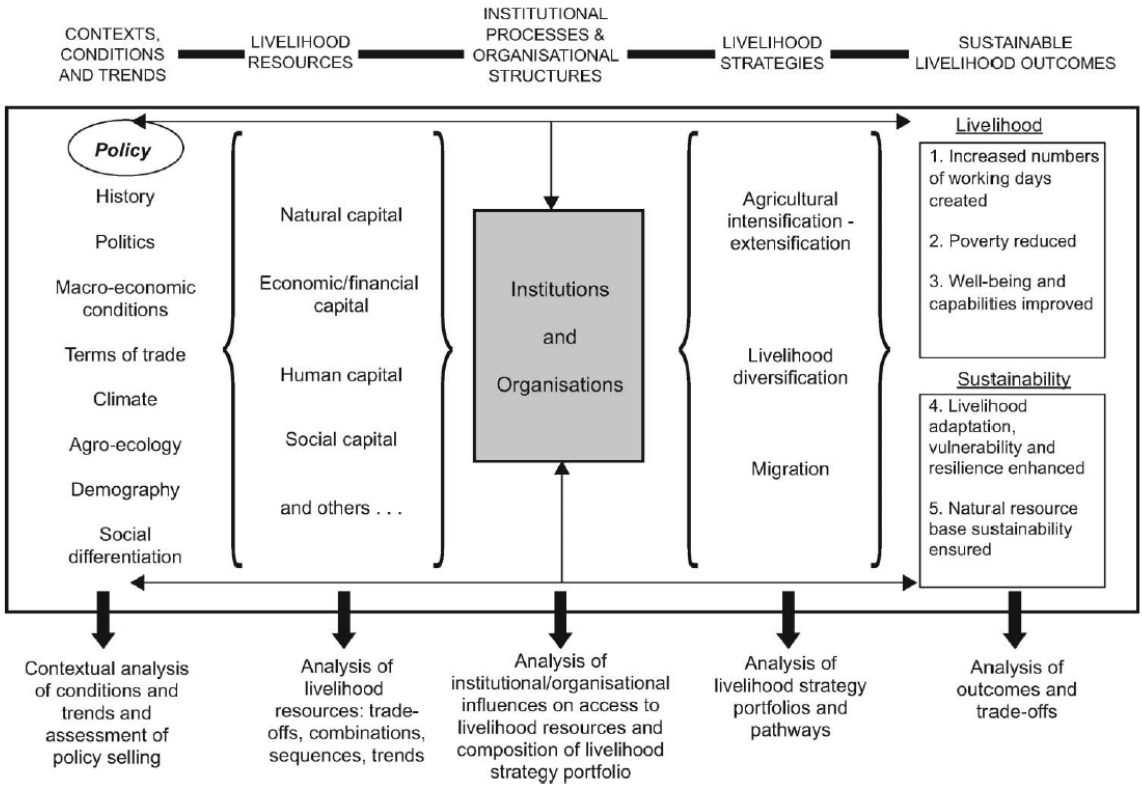


Figure 12: Sustainable rural livelihoods framework: A framework for analysis (Scoones, 1998, p. 4)

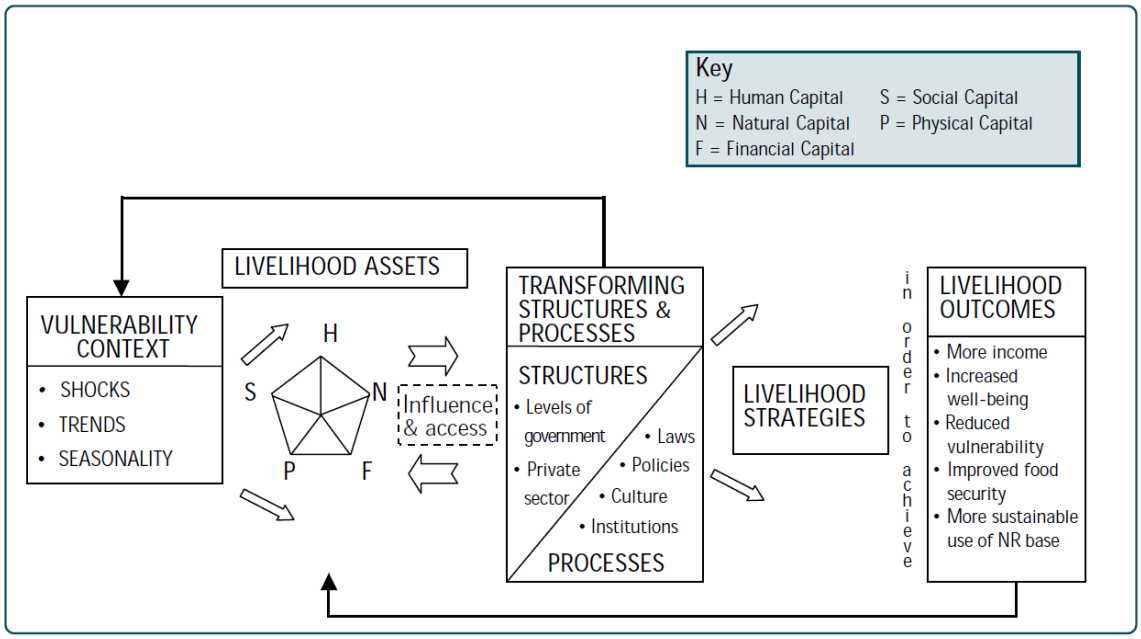


Figure 13: The sustainable livelihoods framework (DFID, 1999)

The category *livelihood assets* recognises five vital assets/resources, or "capitals": human, social, natural, physical and financial. Livelihood assets directly influence the

capabilities of people to pursue their livelihood strategies. Scoones (2009) argues we must broaden the meaning of livelihood assets to "vehicles for instrumental action (making a living), hermeneutic action (making living meaningful), and emancipatory action (challenging the structures under which one makes a living)" (p.178). *Livelihood assets* and their accessibility are influenced by the *vulnerability context* and *institutional processes and organisational structures*. *Vulnerability context* refers to the dual aspects of external threats (for example from climate, markets or disasters) and internal coping capacity of particular communities, households or individuals (Allison & Ellis, 2001). This means that people or households affected by unexpected events are considered not as passive victims but rather as active decision-makers, participating in exploring problems and more effective and sustainable development programmes (Krantz, 2001), aiming sometimes for transformation and meaningful changes. *Institutional processes and organisational structures* represent the social, organisational and institutional environments that determine people's access to livelihood assets to pursue their livelihood strategies and ultimately form their livelihood outcomes. In terms of *livelihood strategies*, they are arrangements and combinations of activities that people undertake to attain their livelihood objectives. There are various livelihood strategies according to different livelihood assets, political structures and vulnerability contexts. Finally, *livelihood outcomes* refer to the outputs or achievements of livelihood strategies. Such outcomes might include more income, increased well-being, reduced vulnerability, increased food security and more sustainable use of the natural resource base. Despite clear and distinctive outcomes, Scoones (1998) warns that there is "no neat, simple algorithm for objectively measuring sustainable livelihoods" (p.7), due to the vagueness of, and various ways of assessing, these outcomes. There is always negotiation, trade-offs and contradictions among these livelihood outcomes. This does not imply that to achieve sustainable livelihoods, there must be equal weight given to each outcome (Chambers & Conway, 1992; Scoones, 1998, 2009).

The SLA draws our attention not only to outcomes of development programmes but also to combinations, trade-offs and negotiations within the processes and activities by which people make their living. This is an actor-oriented or people-centred approach, which offers "a descriptive analysis [that] portrays a complex web of activities and interactions that emphasise the diversity of ways people make a living" (Scoones, 2009, p. 172). For example, with the

concept of entitlement drawing from the work of Sen (1981), the meaning of livelihood assets goes beyond the physical and material resources that people draw on in pursuing their livelihood strategies. In particular, individuals' assets are resources with which they build not just their livelihoods but also their capacities to act. De Haan and Zoomers (2005) argue that "assets should not be understood only as things that allow survival, adaptation and poverty alleviation: they are also the basis of agents' power to act and to reproduce, challenge or change the rules that govern the control, use and transformation of resources" (p.32). This also hints at flexible combinations and trade-offs among assets, which means different assets can be converted and transformed into others, or can support and undermine others in specific contexts. The improvement of irrigation canals (physical assets), for instance, can be converted into a human asset as it reduces farming time and might increase the amount of time available to people for learning new knowledge or improving social connectedness. Improvement of irrigation systems in Thai Binh will be detailed in the next sections.

Some critiques of the SLA in practice

It would be remiss to not mention some key critiques and limits of the SLA in practice, and consider ways moving forward. Ian Scoones, for example, from the early days of the SLA has discussed the imperfections and difficulties of this approach in practice, identifying its complexity, the overlap between and vagueness of its key concepts, and its integration of somehow disparate components. Batterbury (2016) even claims that the SLA is "expensive, uncomfortable and unworkable" (p.493). Morse et al. (2009) assert it is easier said than done, calling it a "convenient label" and even "mechanical" and "superficial" in practice.

There are some notable difficulties and challenges of the SLA in practice given the multiplicity and complexity of local livelihoods. For example, the SLA often takes a narrow perspective of growth-oriented objectives. Practitioners and researchers often emphasise the production and economic aspects, or the investments and gains (De Haan, 2012; Morse et al., 2009; Scoones, 2009). There is an overprivileging of not only conventional economic gains but also technological, scientific and short-term benefits. This sometimes leads to oversimplification in terms of social bonds and power relations (De Haan, 2012; Etzold, Bohle, Keck, & Zingel, 2009; McLean, 2015), intangible and long-term effects (Frost et al., 2007; Williams, Meth, & Willis, 2014) and many other unknown factors and actors. For example,

Williams et al. (2014) point out ways that people manage their daily lives on an operational level, such as non-tax activities, illegal activities, unpaid labour, gifts, networking (family, neighbour), street vendor activities, charity, pensions for the poor, and so on. However, there is an oversimplification or exclusion in analysing local livelihoods. Practitioners or donors often focus on formal activities, primarily focusing on heads of households, legal activities under tax systems, wages, paid income from labour performance and gains from markets. Other activities are often ignored, or pathologised.

Undue focus on specifically local activities also sometimes means that the SLA is prone to “localism”, which neglects factors, linkages and drivers at other scales, as well as dismisses the effects of local livelihood programmes or the local place-based livelihood transformations on other scales (Miller, 2014; Scoones, 2009). To illustrate for this argument, Miller (2014) states that local household livelihoods have never been local in generating changes and responding to changes. Exemplifying household livelihoods in the Mekong Delta River in Vietnam under wider political scales (e.g. historical geopolitics, national policy trends, global economics) and environmental processes (e.g. climate change and Mekong regional trans-riparian boundary projects), she describes how local people are not passive victims of wider-scale changes, but also even “influence, resist and respond to change structured at more remote scales through new networks, institutions and collaborations” (p.312). This means that a “naïve localism” can limit our understanding of complexity, multiplicity and already-present transformation of local livelihood realities, as well as the possibilities of these local transformations for other scales.

In extending and developing the SLA at different scales, Scoones—one of the originators of the approach—emphasises a need for a “wake-up call” for more innovative thinking and experimentation to re-energise the SLA. Two main points can be taken from the recommendations made by Scoones (2009). Firstly, he encourages practitioners and researchers to move across scales in order to avoid localism or rigid boundaries, and still “remain firmly rooted in place and context” (p.188). He suggests practitioners follow “networks, linkages, connections, flows and chains” in tracing livelihoods. This would imply no separation amongst different scales, aspects and areas, while they remain locally embedded. This is understood as tracing “livelihood trajectories” in McLean (2015) and De Haan and Zoomers (2005). This work explores the processes by which people negotiate access to livelihood

opportunities. The point here is that understanding the processes through which people make their living is about not just revealing the complexity and multiplicity of livelihood outcomes but also opening up opportunities for more sustainable livelihoods, even though some strategies may be successful and some may not. Livelihood analysis thus might consider a wider range of factors and actors in relation to particular livelihoods. It credits and acknowledges *all* factors and actors involved in the processes through which people make their living: tangible and intangible assets, institutions, organisations, poverty, environment, incomes, shocks, climate, trends, well-beings, cultures, education, future, sustainability, values, economics, generations and scales, amongst others (Scoones, 2009).

Scoones, particular calls for flexible and open-minded perspectives in analysing and developing sustainable livelihoods—indeed, an experimental attitude. Indeed, this reflective and open-minded perspective following postdevelopment project mentioned in the Introduction of the thesis. This attitude is about finding space for change, an acceptance of uncertainty and dynamicity, and a willingness to work in process, building initiatives up from particular favourable conditions as the opportunities arise, even though they might emerge only from niches, at the smallest scale or in the margins.

In short, the SLA is comprehensive and useful as a conceptual model for knowing the diverse ways that people make a living, that is, the local livelihood reality. To avoid the limits and critiques in operationalisation or application of the SLA mentioned above, tracing livelihood trajectories with an experimental attitude can provide rich descriptions of local livelihood realities. In other words, livelihood trajectories offer critical knowing on local sustainable livelihoods, that goes beyond conventional application of the SLA; and it is open-minded and reflexive approach. The chapter thus does not follow the conventional sustainable livelihood analysis where the five categories (i.e., vulnerable context, livelihood assets, institution and organisations, livelihood strategy and livelihood outcomes) are conveyed for detailed information and their mutual connections. Rather, this chapter elicits and analyses data following these categories, and then visualises local livelihood trajectories according to the effects of water-related CCAIs. Before doing this, in the next section, I will indicate how the SLA is applied appropriately through research methods, activities and the apparatus used.

2.3. Research methods and activities

To shed light on local livelihood trajectories, multiple research methods have been applied in the thesis, namely interviews, focus group meetings, transect walks, direct observation and analysis of archival sources.

Archival sources

Data for this thesis has been collected from multiple sources and different types of documents. These include official regulations such as Vietnamese strategies, laws, policies and decisions; scientific reports from both governmental agencies and NGOs; administrative documents from national, provincial, district and community levels and different ministries such as the Ministry of Natural Resources and Environment (MONRE), the Ministry of Agriculture and Rural Development (MARD), the Ministry of Planning and Investment (MPI) and the General Statistics Office (GSO). The archival sources include information and data from relevant websites. For example, to obtain historical data on cultivation calendars, particular local farming activities and corresponding weather conditions before carrying outfield research, I accessed data from the website of the Thai Binh Meteorological and Hydrological Station, local media sources and even Facebook pages of local residents. During the collection of archival documents from local governmental agencies, I also set up further connections and arrangements for research activities such as transect walks, focus group meetings and individual semi-structured interviews with locals in my two case-study communities (Roche, 2010).

Transect walks

Transect walks are promenades through the research area to gain an understanding of local context and to prepare for further research activities. Transect walks can be used to compare reactions and discussions of different types of participants and stakeholders in particular research or projects, such as government officials, NGO team members or the local community. These walks can provide a good cross-section of information that can be used for specific purposes of verification and appraisal of archival sources (Keller, 2018).

In the course of this field observation, I was sometimes accompanied by local research assistants, locals and even community leaders living locally and working at local administrative

agencies. During these walks, many bits of information were collected and elicited—they may be everything that I encountered or noticed such as local water-related issues, governmental CCAIs, locals' daily conversations and activities. I also had vivid discussions with both research assistants and locals. These discussions were considered as informal interviews. I also recorded some of them with consent and took field notes for others.

Transect walks significantly supported the focus group meetings. After presenting my topics and purposes for group meetings through pictures of the local area and historical data about specific local events, locals were impressive in their willingness to talk with me. This reflected the effort I made to understand and be empathetic with local lives during my field research. With this careful preparation, I was able to have productive and engaged conversations with locals (Cameron, 2010).

Focus groups

For qualitative analysis, focus group meetings are a widely recommended method for data collection. This research method is appropriate for capturing the nuances and complexities of local realities, and especially the effects of climate change adaptation interventions (Cameron, 2010). Conducting focus group meetings also minimises the time spent on introductions to the research and builds trust for further field activities such as semi-structured interviews. Providing spaces for locals to present and discuss their perspectives, this method is ideal for exploring how locals assess specific CCAIs, for example how locals in Nam Hung and Quoc Tuan assess the effects of an irrigation programme on their farming activities. Group discussions also help to identify the limits and side effects of these CCAIs. Local place-based solutions or adaptation to these effects as well as climate change impacts are also revealed at both the household and community levels.

Focus groups were carried out only in my first field visit from 21st April to 10th July 2016. There were four group meetings held in each community, and these involved four local non-profit organisations including farmers' associations, women's associations, youth associations and veteran associations. The formation of these groups was not associated with my topics but rather with characteristics of particular groups of local participants, determined by convenience at the field sites and other logistical requirements. These were somewhat opportunistic, although still a planned part of the research design. This thesis is not focused

on ethnographic analysis of participants, but it is worth pointing out that having a diversity of these kinds of groups (i.e., farmers, young people, women, veterans) helps counteract some of the limits of the focus group method, such as the dominance of talkative members and the silence of others (Cameron, 2010). This is because all participants in a group meeting are familiar with each other and somewhat share their identities as per the specific group.

In order to carry out focus group meetings under Vietnam's communist administrative system, I had to ask for permission from the local chairman of the People's Committee. I was also supported significantly by local research assistants in identifying and recruiting research participants. The number of participants per focus group varied and depended on how participants arranged their time to make the discussion happen. All focus groups were held at local community halls with the presence of and even introduction by local officials. This is de facto culture in organising a focus group or meeting in the Vietnamese context. This was also a safe way for me to approach locals and ensure ethical considerations under the guidelines of the University of Canterbury. In addition, in some cases, local responses in these kinds of focus group meetings might provoke conflicts or tension between locals and local officials. Coming to my group meetings held at community halls meant that all my local participants were voluntarily attending and being aware of the likelihood that their responses might be noticed by local officials.

Individual semi-structured interviews

In the context of Vietnam, the presence of local officials is de facto compulsory in conducting focus group meetings, and this was especially the case at the time of my first field trip, which coincided with the national general election.[10] This meant that people were reluctant to talk openly.. Still, publicly judging and assessing impacts of governmental interventions on local livelihoods and daily lives would in some sense also involve sensitive discussions. I therefore conducted semi-structured individual interviews with locals for a deeper understanding of effects of water-related CCAIs on their livelihoods and daily lives.

The openness of the semi-structured interviews allowed me to follow SLA-informed questions but also gave me the space and flexibility to discuss with a range of local actors in

[10] The national general election is held every five years in Vietnam. Carrying out focus group research around this time was very sensitive. Indeed, I had to postpone some group meetings due to the reluctance of both local officials and research participants.

specific situations (Dunn, 2010). To identify participants for semi-structured interviews, I initially followed up with people who had participated in my group meetings to get a deeper explanation of their perspectives, thoughts and perceptions, and *honest* assessments of government CCAIs. During “chit-chats” before and after interviews, I was also introduced to other potential participants for more individual interviews. In total, I conducted 29 individual semi-structured interviews in my two case-study communities. There were also many “chit-chats” or *informal* conversations where I took advantage of random interchanges with locals at street restaurants or during transect walks, as well as conversations with my relatives who are farmers in communities neighbouring my case-study communities. Some of them I could record with their consent while others were recalled via my field notes.

In short, this section has described the research methods and activities applied for exploring local livelihood realities. The methods employed are conventional and have been widely adopted by scholars for qualitative analysis within development studies. Via these research methods and activities, local livelihood realities have been explored and described analytically and empirically. The next section thus will describe how local livelihood realities look through the SLA with additional recommendations and amendments.

2.4. Water-related CCAIs and local livelihood trajectories

Based on the methods outlined in the previous section, this section aims to present rich descriptions of the effects of water-related CCAIs on local livelihoods, particularly rice production. The main purpose is to unfold the mess of these developmentalist water-related CCAIs that includes desires and hopes, indeed expected beneficial outcomes; failures and disappointments, even maladaptation; and other influencing factors. The discussion first explores local livelihood trajectories following the expected effects or beneficial outcomes of water-related CCAIs that of programmes on infrastructure improvement and water management plans and policies in Thai Binh province. Second, livelihood trajectories in relation to maladaptation are also explored. This section also describes livelihood trajectories as they are shaped by other influencing factors and actors in relation to water-related CCAIs.

Local livelihood trajectories and the expected effects

The slogan "*New rurality, New appearance, New vitality*" (Figure 14) is highly visible and familiar to everyone in rural areas of Vietnam, and particularly in Thai Binh Province, where was the first community achieved the national criteria for "New rurality". There are many government campaigns about the New Rural Programme (NRP). This programme has implemented many sub-projects focusing on infrastructure development, education, environment, public health and other social affairs. This reflects a political will for all rural communities across Vietnam, and local officials will do whatever they can to achieve these goals.

Nông thôn mới, Diện mạo mới, Sức sống mới
"New rurality, New appearance, New vitality"
Figure 14: Slogan for the New Rural Programme

There are big trucks, tractors, ploughs and motorbikes on the new, wide concrete pathways crossing the paddy fields. Both the People's Committee of Nam Hung Commune (2015) and the People's Committee of Quoc Tuan Commune (2015) have been praised for

achieving big changes regarding in-field infrastructure and irrigation systems for rice production. Infrastructure programmes and improved irrigation systems have brought benefits to local communities in Thai Binh. The improvements in physical assets—such as irrigation and drainage canals, outlet sluices and pump stations—affect farming activities for both *Vụ Xuân* and *Vụ Mùa* and have attracted great praise from local farmers.

Due to complex water management schemes outlined in the previous chapter, both communities experienced lower flood peaks and more rapid drainage during disaster incidents in the rainy season, recently, either in the wet or dry year. This supports *Vụ Mùa*, while better water accessibility in the dry season ensures a good harvest for *Vụ Xuân*. For example, one of my participants responded.

> There have been fewer floods recently and less serious floods in the big river Tra Ly. We now have less excessive water in the fields compared with before. If a flood occurs, it is drained out immediately… because the local agricultural cooperative has basically done very well… Now we have less risk of flooding and the rice grows well. (1T1, 21st June 2016)

These improvements in irrigation infrastructure and local access to fresh water directly reduce manual labour and farming time for local farmers. Figure 15 and Figure 16 show common tools that local farmers used in the past to irrigate their fields, respectively the tripod scoop/*Gầu dây* and small pumps. Nowadays they merely need to install a pipe at the edge of their fields and between canals, as shown in Figure 17. When water levels are high enough, they just open the pipe to ensure a good connection between their fields and local canals. Water reaches their field easily, and then they just need to close the pipe.[11] This lessens direct farming time and manual labour and avoids the fuel cost of transporting private pumps.

[11] Local farmers often use hoes to open or close the pipe, circled in red in Figure 17.

Figure 15: People used the tripod scoop (*Gầu dây*) to transfer water for irrigation
[https://hieuminh.org/2014/02/08/tat-nuoc-gau-day/]

Figure 16: Using a private pump to ensure enough water for land preparation for *Vụ Mùa*
[Photo taken in Quoc Tuan, 5th July 2016]

Figure 17: A pipe connecting a paddy field to canal
[Photo taken in Quoc Tuan, 10th November 2017]

Sufficient water can reduce weed development and thus reduce weeding time and expenditure on herbicides. Concrete canals are also seen to reduce weeding time, especially for those whose field bunds are on canal edges. This is significant because before starting any crop, farmers need to prepare their fields. This entails clearing all remnant plant roots, potential pests, insects and weeds from their fields, as well as surrounding areas including banks of canals and rivers.

Concrete canals require less land, while also offering wider in-field pathways, which is a big change for local farmers. In-field pathways were in the past small and earthen, easily crumbled underfoot and were slippery after rain. Getting around for daily farming activities and delivering harvested rice from fields to local houses was challenging during the rainy season. Wider and concreted in-field pathways are thus convenient for farmers and reduce farming time. They also pave the way for modernising rice production with the appearance of cultivation machinery.

Water management is currently more reliable at critical phases of rice growth, which has led to the new farming practice of direct seeding. This practice has gradually replaced the conventional one of transplanting in some areas. This change in livelihood strategy significantly affects local farmers' lives, particularly in riparian Quoc Tuan. Changing from transplanting to direct seeding can save a lot of farming time and ease much manual labour for local farmers. In Thai Binh, transplanting, a very time-consuming activity, was popular in the past. Famers often needed help from relatives or friends or hired extra workers to finish the job at particular times because water availability was limited, especially in the dry season. Figure 18 below shows one farmer carrying out direct seeding (foreground) compared to the many others required for transplanting, in a similar field area (background). One participant responds that he currently needs only one day to direct-seed his 8 sào[12] field, while it used to take "around seven or eight days if I did the transplanting alone" (1N, 20th June 2016).

Figure 18: A farmer using direct seeding against many others using transplanting
[http://sonnptnt.thaibinh.gov.vn/ct/News/Lists/TrongChot/View_Detail.aspx?ParentID=&ItemID=98]

New irrigation activities and direct seeding thus significantly reduce manual labour for local farmers. This is a big deal for farmers who used to work manually for long periods in their fields, especially in the harsh climate of mid-summer (June/July), when outside temperatures can reach up to 40°C in Thai Binh. There is an idiom, *Bán mặt cho đất, bán lưng cho trời*/ "To

[12] In the North of Vietnam, 1 sào is equal to 360 m^2.

toil and moil", which represents how farmers, in transplanting rice, have to stoop for long days in the hot weather (see the top part of Figure 18). The same feelings are expressed for manually irrigating with the tripod scoop (see Figure 15). Many participants in both case-study communities, Nam Hung and Quoc Tuan, expressed that farming is now much easier and less manual than before.

Participants also mentioned the financial benefits of having sufficient water, for example decreased petrol costs. Also, having sufficient water in fields can reduce the quantity of fertilisers and pesticides needed. For example, fertiliser spread on dry fields evaporates, while on wet fields it dissolves into the water and supports rice plants better. Plants grow well and then can better resist extreme weather, pests and disease, while requiring less agrochemicals. As a result, lower agricultural costs and higher yields support local income.

Decreasing farming time also allows ordinary farmers to take on extra non-farm work, which in turn enables them to earn more money to feed their families. For example, after finishing direct seeding in her fields, one of my participants had an extra job as a transplanting worker in a neighbouring community for four days, for which she earned around VND 1.000,000 (equivalent to NZ$66). This is large amount of money for local people, where an average salary per month for one factory worker is around VND 5.000,000 (NZ$333).

Changes in local well-being and community assets, attributed to the implementation of water-related CCAIs, were also noticed. Farmers now have more valuable time for family and to join in on volunteer jobs or other communal and social activities, for example taking care of local pagodas, churches or temples, which enhances local connectedness and other spiritual values.

> Less time for irrigating and more convenient in-field pathways save a lot of the time we need to spend on farming activities. … We therefore have more time for our family, hamlet activities and other daily purposes. (1T1, 21st June 2016)

In short, the water-related CCAIs bring many benefits for local residents including more income sources, lower extra agricultural costs and higher rice yield. Local farmers also experience decreased manual labour due to improved irrigation facilities, new concrete canals and wider in-field pathways. Better water accessibility saves a lot of farming time, which also enhances local well-being.

Further tracing livelihood trajectories in relation to these benefits, there are also some indirect and performative maladaptations. Firstly, shifting from transplanting to direct seeding may raise concerns due to the uncertainty of climate change impacts and incomplete irrigation and drainage systems. Despite great improvement in irrigation infrastructure and drainage facilities such as outlet sluices, canals and pump stations, many other facilities are currently outdated in the Red River delta in general and Thai Binh in particular (DARD, 2011a; Ngo Dinh Tuan, 2003; Ritzema et al., 2008; Tran Ngoc Thang, Nguyen Hoang Long, & Nguyen Xuan Hai, 2014). There is still a high risk of flooding (DONRE, 2012). After heavy rain or mild floods, it can take up to five days for the lowest fields to be drained due to uneven land in some areas. In this situation, germinated seeds and infant rice plants in the fields following direct seeding practice are very sensitive and easily spoiled in hot and wet conditions, particularly for *Vụ Mùa.* This can seriously affect crops. Similarly, in the dry season, if germinated seeds are just spread onto the fields and there is an incident of saltwater intrusion, even for a very short time, germinated seeds and infant plants cannot cope with the harsh conditions this creates. This also applies in other extreme conditions, such as cold spells in *Vụ Xuân.* Young rice plants can deteriorate during cold weather in Quoc Tuan. One of my local participants described the situation in Quoc Tuan:

> After direct seeding here [in Quoc Tuan] young rice plants at early vegetative phases were affected badly by cold weather in *Vụ Xuân* 2016. Some households in my hamlets had to re-seed their fields as their rice plants could not bear cold weather. Some others gave up their fields and did not achieve any significant harvest. (1H2, 21st June 2016).

In Nam Hung, where farmers practised transplanting, seedlings resisted cold spells and saltwater better than did germinated seeds, which ensured high yields for locals in Nam Hung.

Secondly, direct seeding also raises environmental concerns. Following direct seeding, moist and fertile soil is required to germinate seeds. These are also great conditions for weeds to develop in warm weather in *Vụ Mùa* (sometimes even in *Vụ Xuân*). Thus, large quantities of herbicides are often required to ensure a good harvest. Local residents are now really worried about this, as one of them expressed to me:

> We know that it is very harmful for us as we use many herbicides currently; you know the Agent Orange that American troops used in the Vietnam War was a kind of herbicide.[13] But if we do not use herbicides, we cannot cope with weed development. (1Th3, 25th May 2016)

Third, a false sense of security among local residents given the perception of "better" water management can also increase adverse impacts when flooding happens (Hansson & Ekenberg, 2002). This change affects local skills or human assets in dealing with potential risks. For example, one of my participants in Quoc Tuan reported that her household had lost 20% of its rice crop in *Vụ Xuân* 2016. She placed too much trust in the drainage capacity of the irrigation systems and was therefore less careful with regards to paddy fields. After spreading germinated seeds, she left for her studies in the city for a while. It turned out that there was heavy rain in that period, and water could not be drained out properly from her field, which badly affected the rice plants and ultimately the harvest (1N2, 21st June 2016). Similarly, due to perceptions of "better" water management, few households now have private pumps or tripod scoops (*gầu dây*). In the case of water scarcity, they can no longer independently irrigate water in time, which can trigger adverse impacts from these incidents.

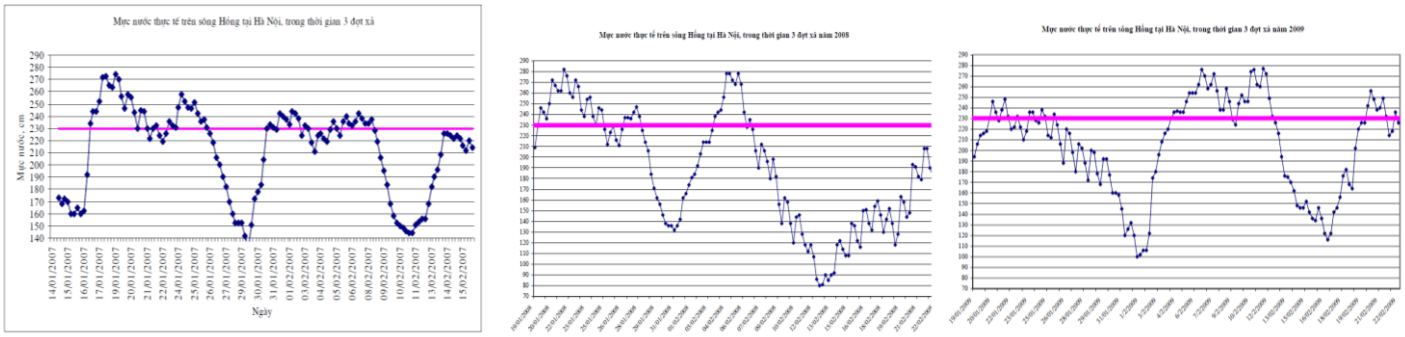
Local livelihood trajectories and maladaptation of water-related CCAIs

Now I turn to tracing local livelihood impacts of direct unexpected effects of water-related CCAIs. There are four main unexpected effects, including lack of fresh water, salinity intrusion, the side effects of hierarchy water management systems and loss of natural sediment.

First, a lack of fresh water in the dry season is noticeable in the Red River delta generally, particularly in the coastal province of Thai Binh. The previous chapter described the risk of water scarcity under climate change in Thai Binh. This section discusses water scarcity resulting particularly from the operation of water-related CCAIs. The strict management of dams and irrigation facilities in upper stream areas caused disrupted flows in the Red River (Nguyen Lan Chau, 2009) (see section 1.5). Figure 19 shows that water levels in intervals where dam spillways are kept closed is extremely low compared to the minimum levels for essential demand in downstream areas. Dam spillways are only lifted at particular periods in

[13] See Stellman, Stellman, Christian, Weber, and Tomasallo (2003) about Agent Orange use during the Vietnam war.

January and February; yet rice farming needs water for almost the entire crop cycle. This means there is a lack of water in *Vụ Xuân* from early March to early June in downstream areas (MONRE, 2013).



2007 **2008** **2009**

: Minimum water level in lower regions of the Red River basin (at Ha Noi station).
: Observed water levels at Ha Noi station, Red River, January-February in 2007, 2008 and 2009

Figure 19: Water levels at Ha Noi station on the Red River, during three periods of dams lifting their spillways in 2007, 2008 and 2009 [January–February] (Nguyen Lan Chau, 2009, pp. 207-208)

This inadequate accessibility of fresh water in March, April and May has therefore had negative impacts on agricultural practices and crop productivity in *Vụ Xuân*. For example, even in Quoc Tuan, a riparian community where accessing water is much easier than in many other communities in Thai Binh, local farmers *still* suffered from water scarcity during *Vụ Xuân*.

> At that time, water in the Red River is too low. The local agricultural cooperative can only manage water into local canals at particular lower areas. It therefore cannot reach up to our high land fields. Like with the last crop (*Vụ Xuân* 2016), there was a total lack of water in the late reproductive phase in our field [around April]. (1T1, 21st June 2016)

The lack of fresh water for agricultural activities is worse in coastal Nam Hung during the dry season, which badly affects local rice farming and other domestic activities. For example, apart from insufficient water for irrigation, farmers also cannot water their gardens or wash their clothes in the rivers, as illustrated in Figure 20.

Figure 20: A local river in the earlier rainy season [Photo taken 3rd June 2016]

Figure 21: A local river in the dry season [Photo taken by Anh Pham Van Tuan, 21st November 2012

To a certain degree, water scarcity even occurs in the rainy season due to the operation of irrigation schemes and flood control regulations. This is because before any coming storms or potential heavy rains, local agricultural cooperatives often drain water out of local rivers and canals to avoid high floodwater levels. There is even an idiom for these kinds of water management practices: *Tháo cạn lòng sông, giữ nông mặt ruộng*/"To dry out the riverbed, to keep little water in field". In some circumstances, several storms are forecasted and local rivers and canals are dried out for quite a long time. This affects rice plants' growth and productivity, particularly in highland fields, as local farmers cannot access sufficient fresh water.

Secondly, saltwater intrusion tends to accompany fresh water scarcity, especially in coastal areas like Nam Hung, and there is a high risk of saline soil. There are two ways that arable soil becomes affected by salinity in coastal areas: saltwater on the surface directly affects the soil, and salt is also transmitted into the top soil layer in paddy fields through saline groundwater. Salt concentration in local fields is sometimes around 2–3‰, while in local rivers it is much lower at 0.8–0.9‰ (2H, 20th November 2017). A salt concentration of 2–3‰ does not only harm rice plants at early vegetative phases, it also leads to more areas of arable soil becoming saline (Tran Ngoc Thang et al., 2014). Local residents blame maladaptation of water-related CCAIs for elevated salinity and acid sulphate levels in 150 hectares of soil in Nan Hung (MCD, 2012). Saltwater intrusion is also even reported in Quoc Tuan, which is far from the coast. Some household fields in lowland areas have suffered from brackish water.

Top-down and hierarchical water management also causes more serious water scarcity and salinity in particular times and places. For example, when there is saltwater intrusion, the community needs to drain this water and replace it with fresh water so that the rice plants can recover. This happened in Nam Hung in *Vụ Xuân* 2017, when the local agricultural cooperative was unable to drain the saltwater. There is a big outlet sluice (*Cống Khổng*) located in Nam Hung that is also responsible for draining water for several communities. This sluice is controlled at a higher administrative level by Cụm thủy nông Nam Tiền Hải (Infra District Irrigation and Drainage Management Companies) (see Chapter 1, Figure 10), which decided that it needed to stay closed to keep enough water in for other surrounding communities at that time. Hierarchical water management thus does not allow leaders at the Nam Hung agricultural cooperative to open this sluice. This means that despite being aware of high salinity in their fields, local leaders and farmers cannot do anything to improve the situation, which of course affects local rice production as well as increasing the risk of permanent saline and acid sulphate soil.

There is another maladaptation due to changes in institutional processes in relation to water-related CCAIs, particularly the Land Consolidation Plan. This intervention re-allocated small fields into larger ones (see Figure 8), which caused some drawbacks for long-term risk preparedness. Before this intervention, one local household often cultivated many small field plots. Locals often planted many varieties of rice and plants. These diverse varieties were a significant buffer for locals in case of climate-related disasters (Marsh et al., 2006). For example, in circumstances of saltwater intrusion, water scarcity and flooding, the diverse landscape means different land elevations, crop varieties and locations, meaning that some field plots are safer and incur less loss than others. Similarly, by virtue of different rice varieties, they lose less in an epidemic because pests often attack different rice varieties differently. However, these conditions have changed with the Land Consolidation Plan, which limits locals' options for adapting to saltwater intrusion, floods or pest and plant disease epidemics.

Fourth, the loss of natural sediment is another maladaptation for rice production due to water-related CCAIs. With the completion of the Hoa Binh Dam, one of the first large upstream dams, sediment transport capacity dropped by around 61%, particularly in the Ba La estuary where Nam Hung is situated (Vinh, Ouillon, Thanh, & Chu, 2014). Considered the eighth siltiest river in the world, the Red River, carrying 130 million tons of sediment every

year, has historically played an important role in agricultural production in Thai Binh (Tessier, 2013). More importantly, this sediment is also very important for leaching salt and toxins after saltwater intrusion (Zhang, Xu, Zhang, & Jin, 2003). The loss of sediment to the downstream areas is also serious due to governmental water management schemes and related policies. In particular, worried about the breakdown of outdated irrigation facilities during flooding, the Vietnamese government limits irrigating with silty water in the rainy season by imposing strict technical criteria and requirements as to when and how intake gates can be operated in order to minimise flood risk (MOST, 2011; Ngo Dinh Tuan, 2003).

These changes have notable impacts on livelihoods in terms of implications for accessibility of these natural assets for rice production in the two case-study communities. Firstly, financial loss is of primary concern with regards to these unexpected effects. The extra costs for fertilisers and herbicides are due to weed development in the case of fields without enough water. During the incidents of water scarcity or saltwater intrusion, farmers must also expend more effort and incur greater costs (e.g., for fuel and pumping services) to ensure sufficient water and crop productivity.

Farmers in both case-study communities also connect the lack of sediment-laden water with a high risk of pest epidemics. One of my participants recalled farming with plenty of silty water and confirms that lower sediment levels in the water causes more pest epidemic incidents.

> "[A]s silty water was available and convenient to irrigate into our fields, our fields hardly suffered from *Rầy nâu/Nilaparvata lugens/*"brown planthoppers" in the past [...] Now, this water is limited […] It is highly likely our fields will be affected by brown planthoppers and other kinds of pests. (2X, 14th June 2016)

In many cases, pest epidemics turn out disastrously and affect rice plants, which then becomes more sensitive to other adverse factors such as extreme weather events. In these circumstances, extra agrochemicals and farming time are required. Requiring more farming time also reduces opportunities for local farmers to be involved in additional jobs. Ultimately, household incomes can be significantly affected.

Late cropping is considered another risk for fields affected by water scarcity, flooding or saltwater intrusion. Late cropping often causes multiple subsequent obstacles to good rice

yields. For example, in the case of one local farmer in Quoc Tuan in *Vụ Xuân* 2016, her rice plants deteriorated due to brackish water around early February when they were at the early vegetative stage. New seedlings were required. By the time she finished transplanting the new seedlings, rice plants in the surrounding fields were already in the mid or late vegetative phases. Her new young rice plants were therefore sensitive to pests such as insects, snails and mice. They were also less resistant to extreme cold weather. She had to use extra pesticides and fertilisers. When it came to harvesting time (according to the local cultivation calendar), she had to harvest her rice even though it had not ripened properly, which significantly reduced her yield.

> My field was affected by brackish water… then I had to transplant new seedlings… so, when I harvested our rice, it was not properly ripe, and the productivity was lower. Last year (Vụ Xuân 2015) I harvested 15 bags of rice for this field, but this year, (you can see) I got only nine bags of rice. I lost six of them. (1T2N: 22nd June 2016)

In some cases, local farmers have sadly given up and let their rice plants die. They do not want to spend a lot of effort and money only to achieve a poor yield. Local farmers perceive late cropping as a vicious cycle.

> You know when your field is late, this a "vicious cycle". Some of my neighbours could not follow the local irrigation or suffered from saltwater in their fields in *Vụ Mùa* 2015. They then had to re-prepare the land and re-transplant. This often takes a while. At the moment, we are harvesting our *Vụ Xuân, 2016* and preparing land for *Vụ Mùa, 2016* while their rice is still in the dough stage. They will probably be late for the next crop… and so the cycle begins again. (2V, 14th June 2016)

Third, environmental issues are a concern for local residents in relation to the unexpected effects of water-related CCAIs in both Nam Hung and Quoc Tuan. In order to ensure as much crop productivity as possible, a lot of pesticides, herbicides and other agrochemicals are often applied, which seriously degrades the local environment including the soil, air and water (Hoai, Sebesvari, Minh, Viet, & Renaud, 2011; Pham Thi Thuy, Van Geluwe, Nguyen Viet Anh, & Van der Bruggen, 2012; Pham Van Hoi, Mol, Oosterveer, & van den Brink, 2009). One study on farmers' health in relation to the application of the most common insecticides registered for use in Thai Binh has shown that 33% of participants were at high risk of adverse effects (Phung Tri Dung, Nguyen Viet Hung, & Tran Thi Tuyet Hanh,

2013). Even though they are not familiar with this research, locals do understand and are aware of potential adverse impacts on their health.

Fourth, these unexpected effects of water-related CCAIs also exacerbate the lack of clean water for domestic use in the dry season, especially in coastal Nam Hung. Even though there are four freshwater sources—rainwater, shallow groundwater, surface water and piped running water—local residents still suffer a serious lack of clean water in the dry season. In particular, surface water is low in the rivers and can also be salty and polluted by agrochemicals at particular times. Rainwater is getting less reliable as the number of days without rain increases (DONRE, 2012). Piped running water is quite expensive for many locals. Shallow groundwater is degraded due to a lack of fresh water in local riverbeds. In some areas, groundwater is even contaminated by heavy metals such as arsenic, iron, manganese, magnesium, as well as other elements (Thu Hoai, 2017). As a result, the lack of fresh water in local riverbeds significantly affects local daily lives.

Local livelihood trajectories and indirect factors and actors

Tracing livelihood trajectories not only focuses on subsequent effects of water-related CCAIs but also seeks to uncover the forces and other factors that shape local livelihood strategies and ultimately outcomes. Understanding these dynamics may open up possibilities for better livelihoods. This section explores some influencing and associated factors in relation to water-related CCAIs and local livelihoods, particularly rice production, in Nam Hung and Quoc Tuan. By describing influencing factors, this section also discloses the processes whereby local farmers respond to changes resulting from water-related CCAIs.

First, the appearance of cultivation machinery services is not a direct effect of water-related CCAIs in Thai Binh, but it does affect local farming activities significantly. Cultivation machinery services are now very common. Local farmers are becoming reliant on cultivation machinery such as harvesters and ploughs. However, there are still some limits to accessing this kind of service. There is inequality, inadequateness and inappropriateness in machinery service distribution. Currently, not many individual households own private cultivation machines, and local farmers cannot work directly with particular service contractors. Individual fields are now larger than before, but they are still smaller than 0.36 hectares (equivalent to 10 sào) (Ritzema et al., 2008). One machine working one individual field moves very quickly;

for example, one rice harvester needs around an hour to complete a 10-sào field. The service costs[14] are not high for local farmers, but the fuel cost for a contractor to travel to a particular paddy field is high, and it takes time. No contractor wants to serve only one individual field. To reduce this cost and allow more paddy fields to be served, agricultural cooperatives take charge of hiring these service contractors for the whole community. Yet there are often limited harvesters available relative to high demand in a short harvesting period, for example only two harvesters for 390 hectares of fields in Quoc Tuan for *Vụ Xuân* 2016. Bureaucratic or incompetent officials too often prioritise particular households based on personal relationships or other personal interests rather than on the basis of actual conditions in the fields, which affects farming activities and crop productivity. This exacerbates issues in relation to machinery services.

For example, one local farmer in Quoc Tuan left me stunned during our interview in *Vụ Xuân* 2016. She was mostly in tears, as she had to wait for four days at her field until as late as 11:00pm to be served by local harvesting contractors. A critical issue here was that if she could not finish harvesting her crop in time there would be adverse impacts on her field. Late harvesting can lead to water filling up in the field as per the prearranged local irrigation plan before the harvest has tacken place, which reduces the harvester's capacity and also badly affects field cleaning activities afterward. Due to the short interval between the two main crops, there would be not enough time for her prepare her land properly for the next crop, a task that often requires two weeks in summer weather conditions. This would lead to a high risk of pest epidemics, and then likely late cropping for the next crop, *Vụ Mùa*. This ultimately results in the vicious cycle discussed above. Similarly, ploughing services in Nam Hung are in high demand during the land preparation stage. For *Vụ Xuân*, land preparation needs to ensure good plough-loosened soil. If the soil is ploughed and exposed for 10 days before it is soaked in water, it can ensure higher yields. Farmers, therefore, want to start this stage earlier. However, they cannot access the ploughing service on their own and instead have to rely on their local agricultural cooperative, which may follow similar behaviours of bureaucratic or incompetent officials, in the case in Quoc Tuan.

14 At the time of my field work, local farmers were paying VND 1.000.000 and VND 1.100.000 respectively for harvesting and ploughing one 10-sào field.

The second influencing factor is participation of ordinary people in relation to implementation of CCAIs. Inadequate participation in local meetings might diminish the effectiveness of governmental officials' interventions on local livelihoods. Scientific information on climate change and natural disasters, and the details of ongoing CCAIs, might not be received and understood by locals. They may be rather passive to the effects of governmental interventions. In contrast, there is more local engagement in implementing water-related CCAIs. There are currently changes in hierarchical administrative systems toward the adoption of a participatory approach. For example, the New Rural Programme, which used to be fully funded by state budgets, has been partly shifted to capital contributions from locals. With this kind of ownership, locals are now feeling more connected and responsible for these public facilities. Besides financial contributions, they are to some extent "more willing to support implementation processes of the New Rural Programme" (1T1, 21st June 2016). This trend leads to changes in power relations between local authorities and ordinary residents.

In terms of rights and responsibilities in managing natural resources and public facilities, on the one hand, local authorities that were familiar with hierarchical operation are now less bureaucratic and slightly more willing to share their "power" for better irrigation or drainage. On the other hand, ordinary residents increasingly recognise their "rights". They are currently willing to raise concerns and make recommendations on local irrigation plans and cultivation calendars, as well as other water management activities.

However, a willingness to listen to and make enquiries and recommendations on the part of local authorities or ordinary residents does not mean that the resulting decisions are always in the best interests of local livelihoods. The relationships between local authorities and ordinary residents in specific situations are complicated. One local official responded as follows:

> If there are conflicts between the local residents' recommendations and the official irrigation plans, "I would *Dại đàn hơn khôn lỏi*/be a "taller poppy",[15] I mean I would follow official plans, instead local recommendations. In the worst case, if there are is bad luck or disasters such as pest epidemics, plant diseases or hot or cold spells and locals' crop productivity reduces,

[15] This idiom is a metaphor for the poppy that is taller being so noticeable that it is likely to be cut first. This refers to people avoiding doing something very different to the general trend or to common practice in order to avoid the risk of being cut down even if their actions might be more appropriate and meaningful.

> the farmers will blame me for their losses, and the higher authorities will also criticise me first. (1H3, 20th June 2016)

This statement discloses one of the reasons for ineffective water management decisions in the local community. This participant is one of the board members of the local agricultural cooperative, responsible for managing water and other rural services and plans. Local irrigation plans and cultivation calendars often closely follow those of the higher administrative levels (e.g., district or province; see Figure 10). Officially speaking, board members of local agricultural cooperatives should collaborate with local farmers in deciding on specific dates for irrigating and draining water, preparing land, broadcasting seeds, transplanting seedlings, harvesting and so on in their communities. However, in many cases, local board members choose to follow mechanistically higher irrigation and cultivation plans over local farmers' recommendations. That way, if there are unwanted effects from their decisions they can comfortably blame the higher plans or systematic problems. This behaviour is considered "safe" in that nobody within the administrative systems is at risk, except for local farmers who have to suffer under inappropriate water management. This can protect political roles, and indeed administrative income sources.

Finally, place attachment and farmer identity somehow shape local farmers' decisions and choices in their farming activities. Elderly farmers, who make up the majority of the labour force for rice farming in rural areas (Le Trinh Hai et al., 2015), consider rice farming as not so much about financial outcomes or profits and more to do with their identity as farmers and the personal satisfaction of connecting with their fields and of consuming and feeding their families with the rice they cultivated themselves. They claim that *đã là nông dân thì không thể không cấy lúa*/"being a farmer, you cannot not farm rice". They take care of their fields more carefully than younger farmers. For example, despite their children recommending that they stop manual labour in the fields, some of my elderly participants put in extra farming time, effort and expenditure to ensure good water accessibility. Before a new crop, they do maintenance on their field's bunds and dredge the surrounding public canals, even though these activities are actually the duty of local agricultural cooperatives, which get seasonal revenues paid by farmers. The relationship between local farmers and others is only not about economic rationality but also about caring for and with their fields. I will return to this example and to local relationships with others in Chapters 5 and 6.

It may appear that the descriptions in the last three sections of local livelihood trajectories are similar to ordinary irrigation negotiations and processes. This may be true. However, these negotiations are comprised of many factors and actors that interact and influence each other. They are dynamic and uncertain and belong to complicated networks. Without these rich descriptions, we cannot understand the processes of forming local realities in relation to the water-related CCAIs mentioned in Chapter 1.

2.5. Conclusion: Knowing livelihood realities and questioning our practices

This chapter addresses my second research question: How are water-related CCAIs enacted on the ground, and do their effects make a difference for locals in the province of Thai Binh? In doing so, the chapter first reviews the SLA as an appropriate and mainstream approach. It then goes beyond the mechanistic application of the SLA, following a postdevelopment perspective to convey critically local realities in relation to water-related CCAIs through tracing their livelihood trajectories. I thus have illustrated the messy reality including the beneficial livelihood outcomes, limits and maladaptations flowing from water-related CCAIs in the province of Thai Binh. This chapter also has, at some extent, answered the question “Whether we are doing the right things and are doing right for climate change adaptation particularly for local communities in the province of Thai Binh”. While this is not new, the rich interpretation and this statement on current water-related CCAIs are essential for finding possibilities or alternatives for more appropriate interventions.

Local livelihood realities

The effects of water-related CCAIs on local livelihoods have been examined and interpreted through the SLA. I have discussed not only livelihood outcomes but also the processes and contexts whereby local farmers have formed their livelihood strategies. These are not conventional descriptions mechanistically following the categories of the SLA (see Figure 12 and Figure 13) but rather accounts of livelihood trajectories in relation to the effects of water-related CCAIs. By tracing livelihood trajectories, the chapter revealed many noticeable negotiations, trade-offs and factors and actors constituting local livelihood realities. These influencing actors and factors comprise vulnerability contexts (e.g., storms, cold spells, floods, dry and wet seasons, water-related CCAIs), physical assets (e.g., infrastructure), social assets (e.g., local awareness and official behaviours and priorities), institutions and

organisations (e.g., agricultural land policy, irrigation plans, hierarchical water management schemes), livelihood strategies (e.g., transplanting and direct seeding practices) and livelihood outcomes (e.g., crop mass, agricultural costs, local well-beings, environmental status). They interact within a complex network and influence each other across scales, boundaries, sectors and aspects to form multiple livelihood realities.

For example, improving canal and irrigation systems can increase water accessibility. Sufficient water supports rice plants and reduces weed development, and then these stronger rice plants can resist harsh weather such as cold spells or saltwater intrusion in *Vụ Xuân.* There is more likely a high yield in this situation. Less fertiliser and herbicide is likely needed for these strong rice plants, which means lower agricultural costs, less agrochemical pollution and more farming time saved. These benefits also affect local well-being, supporting, for example, better social connectedness and communal activities. However, these water-related CCAIs also mean water being used for development purposes. Storing water in upstream reservoirs for electricity generation as well as proactive water management in the dry season results in less silty water, disrupted river flows, water scarcity and salinity intrusion. Moreover, saltwater intrusion and a lack of freshwater may lead to saline soil, which not only affects rice plants but also takes a long time to recover in coastal areas. Natural sediment or silty water is the best treatment for this kind of soil; unfortunately, under current governmental interventions and infrastructure systems, silty water is decreased.

All these actors and factors are always in negotiation as they form particular livelihood strategies or outcomes. Decisions coming out of these processes are multiple and uncertain, which leads to distinctive livelihood strategies at various levels, specific times, scales and circumstances. For example, officials are faced with a trade-off between being a “taller poppy” and listening to or following farmers’ recommendations for the sake of better irrigation, or sticking to high-level official plans to protect their political positions. At the household level, in the cases of saltwater intrusion at the early vegetative phase or a late crop, local farmers have to decide whether they should keep expending more effort, time and money to save their rice plants or stop investing in their paddy fields and accept low yields at particular rice growth phases. This trade-off is also not guaranteed. In many cases, even with increased expenditure for fertilisers and pesticides and high farming time, some farmers still could not achieve a high yield due to the effects of harsh weather conditions on particular crops. There can be an

internal negotiation at the individual level among elderly farmers, whereby they decide when and where they follow their personal identities and other sentiments to devote extra labour in the paddy fields regardless of economic rationalities. In short, local farmers are always in the process of making their decisions, which depend on many actors and factors that are uncertain and unpredictable.

In this chapter, local livelihood realties have been examined with reference to many involved actors and factors. These include irrigation systems, local incomes, agricultural costs, pest epidemics, institutional management, local identity, a hesitance to act for the sake of better water management on the part of local officials, land attachment, trade-offs and so on. This chapter has shown that the water-related CCAIs identified in Chapter 1 are trying to bring about short-term benefits for local farmers. Based on my experience working in this area, there are not many CCAIs dealing with long-term and uncertain impacts, and there is not likely to be much change in Vietnam in the near future in this respect (Dombroski & Do, 2019). Being over-reliant on predictability - indeed on logical, predictable and short-term climate change impacts, current government-led CCAIs do little to adapt to uncertain and unpredictable impacts of climate change. However, it is clear that we need to take the long-term impacts and uncertainties of climate change into account in our adaptation across boundaries, levels, aspects and areas.

Through critical application of the SLA, this interpretation has explicitly exposed the mess due to the developmentalist water-related CCAIs in the province of Thai Binh. There are multiple local livelihood realities in relation to water-related CCAIs, which could bring potential alternatives that can support locals in adapting to adverse impacts either due to climate change or current government-led interventions. For example, the reflection of elder farmers in protecting their fields, the responses or behaviors of farmers who contribute the comments for local authorities in controlling water at the local level. The decisions coming out of the negotiations and trade-offs, either at household, individual or local levels, they are also local alternatives to adapt to changing condition, particular farming production. The conclusion first come out of this interpretation is that Thai Binh government has not been totally doing right their adaptation for their residents in adapting to climate change. And these interventions are not unique solutions for adapting to climate change, there would be possible for other interventions/alternatives that can support locals more significantly and appropriately.

Questioning our practice and attitude for better knowing

With the first conclusion of this chapter mentioned in the preceding paragraphs, I do not mean here to condemn the Vietnamese government or locals in Thai Binh. This climate change adaptation perspective is common and can be found anywhere—even in New Zealand, a country that is ranked second from the top in terms of actively adapting to climate change, according to the Notre Dame Global Adaptation Index (ND-GAIN, n.d.). There are currently 23 local mayors out of 77 in New Zealand who refuse to sign the commitment to zero CO_2 emissions, the Local Government Leaders' Climate Change Declaration of 2017 (New Zealand Geographic, 2019). In order to vote "yes", these leaders asked for more scientific evidence indicating climate change impacts and potential risks on their districts or cities. They prefer to act on knowing in advance, wanting even stronger scientific evidence than what is possible.

This is a perspective or culture of climate change adaptation that is embedded among New Zealand mayors and members of the Vietnamese government alike. Being aware of complexity and unpredictability in climate change impacts and CCAIs, the Vietnamese government, including Thai Binh, gather as much information as possible in advance and works to avoid predicted adverse impacts. This perspective calls for rigorous analysis and strong evidence before action. It also prefers "hard" infrastructure solutions (Lindegaard, 2013) and traditional engineering (Radhakrishnan et al., 2017), for example the domination of current water-related CCAIs by irrigation infrastructure programmes and relevant management strategies and regulations, discussed in Chapter 1.

In this environment of doing climate change adaptation, it may be claimed that the SLA is an approach that supports gathering as much information as possible around particular livelihoods. This approach is in line with the current perspective of the Vietnamese government in doing CCAIs: there is a similar culture in exploring or knowing the effects of water-related CCAIs via the SLA to the implementation of water-related CCAIs discussed in Chapter 1. The interpretation in this chapter is a result of the application of a logical and rational model in dealing with complex and unknowable contexts. The comprehensive and analytical SLA enables us to know about the processes of forming local livelihood realities, for example the trade-offs determining local decisions in dealing with saltwater intrusion or a late crop. However, these decisions are still uncertain and unpredictable since local responses to

saltwater intrusion or a late crop depend on many uncertain and unpredictable factors and actors.

This does not mean that, via the SLA, the effects of water-related CCAIs are not real or possible but rather that they are somehow still unknowable via logical and rational modes. While this is not wrong, it raises questions as to how can we know better in order to do better in the context of unknowable futures. The critical argument that comes out of this chapter is that to know better the effects of CCAIs and then do appropriate climate change adaptation, we must have knowledge and practices that accept uncertainty, unpredictability or unknowable futures.

Chambers (1997) comments on the difficulties of dealing with unknowable futures as development practitioners "often do not know what they do not know" (p.160). For knowing better development work in order to do better, he, then proposes that "self-critical reflexivity is at the core of knowing better" (Chambers, 2017, p. xii). This means that, to know reality better, or in doing M&E better, there is a need to consider our "self-critical reflexivity" or the reflection of our values, attitudes and practices in doing our work, which also explains how we come to know about realities.

Similarly, Scoones (2009) calls for us to consider the "politics of knowledge" as we approach research into livelihoods. He states that "livelihood is a seemingly neutral, descriptive word" (p.184), which supports the idea that livelihood approaches are objective, evidence-based and analytical. However, "livelihoods analysis […] is not a neutral exercise; knowledge production is always conditioned by values, politics and institutional histories and commitments" (Scoones, 2009, p. 185). The politics of knowledge, or of making livelihood knowledge out of particular situations, is not just about the political dimensions within the vulnerability context and institutional structures and organisational processes as categories, illustrated in Figure 12 and Figure 13, but about pre-judgements and politics that affect practitioners and researchers in exploring and analysing local livelihood realities. This means that the values and political interests (indeed practitioners' subjectivities or professions) also influence their process of interpreting local livelihood realities, and indeed influence the realities themselves.

For better knowing about how water-related CCAIs are enacted on the ground or what really happens in relation to its effects, we need to know how our practices, indeed practitioners' subjectivities influence our understanding of realities and the realities themselves. There is a need to unveil how we get to know what are realities in relation to the effects of water-related CCAIs. The next chapter therefore turns to scrutinise and interrogate current mainstream M&E practices and their performance. This might be a starting point to better our knowing about the effects of water-related CCAIs via knowing how M&E practice form the M&E results (indeed realities), which opens us up to alternatives and possibilities to climate change adaptation, particularly in response to uncertainty and unpredictability.

CHAPTER 3

MONITORING AND EVALUATION PRACTICE: ESTABLISHING "MATTERS OF FACT"

> [S]cientific and technical work is made invisible by its own success. When a machine runs efficiently, when a matter of fact is settled, one need focus only on its inputs and outputs and not on its internal complexity. Thus, paradoxically, the more science and technology succeed, the more opaque and obscure they become.
>
> —(Latour, 1999, p. 304)

> [E]valuation outcomes are not descriptions of the 'way things really are' or 'really work', or of some 'true' state of affairs, but instead represent meaningful constructions that individual actors or groups of actors form to 'make sense' of the situations in which they find themselves. The findings are not 'facts' in some ultimate sense but are, instead, literally *created* through an interactive process that *includes* the evaluator (so much for objectivity!) as well as the many stakeholders that are put at some risk by the evaluation. What emerges from this process is one or more *constructions* that *are* the realities of the case.
>
> —(Guba & Lincoln, 1989, p. 8, emphases in original)

3.1. Introduction

So far, I have argued that to better know the effects of our interventions work on climate change adaptation, there is a need of knowing *how* we come to know what happen on the ground. In other words, we need to know by what means the interpretation or representation of these facts are formed. While we have so far explored how a rich description of livelihoods might enable us to understand the effects of CCAIs, in general, monitoring and evaluation is seen as the crucial and "scientific" way to understand and represent the effects of particular interventions. This chapter thus aims to interrogate how current mainstream M&E practices come to interpret and represent the effects of water-related CCAIs, that is, by what means the facts are established.

The chapter begins by analysing current mainstream M&E practices, which are—no surprise—dominated by scientific methods and approaches (as discussed in the introduction to this thesis). Inspired by the work of Bruno Latour and STS colleagues examining how scientific practices operate to create facts and knowledge from laboratories, I then explore these scientific practices and their processes for generating M&E results through an anthropological lens. Apart from revealing the pitfalls of current M&E practices, I argue that such practices do not just measure and display the effects of particular interventions in the form of a bland representation of scientific facts but instead serve to *create* or *make* scientific facts. However, these facts do not define the realities completely. Current mainstream M&E practices deliver official M&E results but cannot reveal some kind of "true state of affairs" as per the second epigraph of this chapter. In what follows, I examine the processes by which these M&E practices are conducted, using Latour and colleagues' contention that scientific facts are both materially and socially constructed. This goes some way toward understanding the difficulties we face in the M&E of CCAIs.

By doing this, this chapter follows the second experimental approach used in this research for knowing reality, that of science and technology studies and the social constructionist approach to scientific facts (introduced on page 14). It provides another form of knowing that we need to appreciate, which helps us understand how CCAIs are enacted on the ground. From this we might see or create possibilities toward alternatives to M&E practices in climate change adaptation.

3.2. Scientific practice in monitoring and evaluation

It does not come as a surprise that, in general, a scientific—even utopic—orientation has dominated current approaches and frameworks developed for the M&E of CCAIs. This section reviews current mainstream M&E practices in use in Vietnam, focusing on those in use for CCAIs. There are three main approaches deployed in relation to climate change adaptation: theories of change, local participatory evaluation and a combination of the two. Below I discuss are three main M&E approaches applied in the VN-Red River Delta Rural Water Supply and Sanitation Project (ID P077287) funded by the World Bank (mentioned in 48). They are not applied only for the World Bank project, but also more generally in Vietnam.

Theories of change

Being aware of the long-time horizons and the uncertainty of climate change, mainstream M&E practices tend to apply or develop theories of change. These theories can be perceived as a series of hypothetical changes related to the implementation of a particular project, and the effects of applying the project's strategies and activities to achieve its mission (Scriven, 1991). A theory of change for a particular intervention works as a road map that is changeable, reflective and much richer than a simple logical framework of an intervention. A theory of change is a process of change (Dhillon & Vaca, 2018, p. 65); this offers project planners, officials and evaluators assumptions as to what is likely to happen and possible effects in unpredictable, complex and dynamic contexts. With assumptions based on particular theories of change, M&E ensures a conceptual, rational and scientific analysis, and then the measuring, describing and judging of the effects of particular interventions.

Currently, there are three notable methods for M&E of CCAIs that are based in such theories of change, namely results-based, process-based and behaviour-based evaluations. Firstly, results-based management or input-output-outcome-based evaluations are applied popularly in intervention management in many organisations and countries, including the UNDP, GEF, OECD, World Bank, United Kingdom, Philippines and Germany, among others. The objectives and outcomes of particular interventions are set up and evaluated based on scientific models, assumptions, logical impact assessments, statistical data and experimental evidence. With action-result chains and cause-effect relationships, the effects of interventions are clearly investigated. The outputs, outcomes and impacts are evaluated corresponding to expected targets from the initial stage of interventions (Viggh et al., 2015; Villanueva, 2010).

For example, to monitor and evaluate the impacts of the World Bank project, results-based or input-output-outcome evaluation is applied to develop outcome indicators (World Bank, 2015). From the overarching development objective, the project established key final outcomes, intermediate outcomes and finally outcome indicators with specific expected numbers. By the end of the project, 950,000 and 850,000 people were, for example, expected to access “improved water sources” and “piped running water” respectively (World Bank, 2011).

Overarching development objective	Poverty alleviation (due to improved health and improved household economies)
Key final outcomes	- Improved health (reduced incidence of water borne diseases); and - Improved household economies (reducing days of absence at work and school and reduced health expenses).
Key intermediate outcomes at particular stages	- Effective use of new water supply; - Effective use of sanitation facilities; and - Improved hygiene practices and sanitation behaviors.
Key outcome indicators	- Number of people accessing piped running water as a result of project intervention; - Number of people in the project areas accessing improved sanitation facilities; - Number of people in project communities who have adopted safe hygiene and sanitation behaviours; - Number of supply and sanitation enterprises established; - Number of incidences of water-borne disease; and - Etc.

Figure 22 : Result chain of the VN-Red River Delta Rural Water Supply and Sanitation Project (adapted from World Bank (2015)

In many cases, the effects of interventions can be long term and cannot be predicted at the initial stage, where process-based evaluation is needed. Therefore, evaluation focuses on benchmarking to the predetermined objectives of adaptation. The life cycle of interventions are divided into given stages with specific targets for each stage. From there, process indicators seek to define and measure progress against each key stage, adjusting ultimate adaptation objectives for particular interventions (Viggh et al., 2015; Villanueva, 2010). From this, ultimate goals can be updated and the necessary indicators and tools can be added to, based on lessons learnt from the periodic M&E reports.

In the World Bank project, for example, annual independent reviews were carried out, as well as mid-term reviews in 2009 and 2011, of the intermediate outcomes in Figure 22. Based on these reviews, the World Bank can see how efficient and effective this investment is. These periodic M&E reports led to modification to initial project objectives. There were some changes in outcomes in terms of expected values and the additional indicators (World Bank, 2015). For example, an indicator of "the number of incidences of water-borne disease" that was not applied from initial stage of the project, but then was added. It is because, based on the change in the incidence of water-borne disease, strong evidence for changes in local residents' health and household economies could be revealed. The use of this indicator enabled the World Bank to claim that there are probably lower household medical charges, a decreased number of absent days for children at school and more working days and productivity for local residents as they are healthier (World Bank, 2013).

The objectives of adaptation interventions sometimes are not achieved, but changes in the behaviour of stakeholders may show the effects of particular interventions. Behavioural change, therefore, can be a good alternative to monitoring and evaluation. Behavioural-change-based evaluation can describe what and how changes occur. These changes to some extent cannot be recognised and measured via logical or linear cause-effect principles but rather by observing and asking participants and stakeholders why the behaviours have changed. The reasons for "success" or "failure" during implementation of interventions are therefore probably identified (Reid & Schipper, 2014; Villanueva, 2010) . For example, after a powerful storm hit one coastal community, the number of collapsed houses was high, the same as with a previous storm of similar magnitude. However, the overall damage level was relatively lower, and the damaged houses were also repairable. When this difference was investigated, it became clear that training courses in early preparation for natural disasters under climate change had led local residents to take extra steps to ensure reduced damage to their houses and properties. They were also more proactive in response to the storms' forecast information and had changed their traditional behaviours. However, it is certain that capturing these kinds of behavioural changes takes time and is not easy for independent evaluators, governmental officials and experts who are outsiders with short visiting timeframes (Bhave, Mishra, & Raghuwanshi, 2014; Villanueva, 2010).

It follows then, that M&E requires extensive local participation and knowledge to really get at and understand changes that have occurred at the ground levels. This leads to the application of local participatory methods for M&E.

Local knowledge and local participation in monitoring and evaluation

At the grassroots level, the impacts of CCAIs on local communities based on official data are sometimes unclear and even in conflict with a "grounded" logical understanding. In this case, participatory approaches based on local knowledge and participation are complementary to classic M&E practices based on a theory of change. Such approaches have been developed and applied in some NGOs (CARE, 2014; UNDP, 2014). With local participation, specific information and the actual benefits of intervention impacts are revealed. This approach encourages local stakeholders to be involved in the adaptation interventions, prolonging the benefits and promoting amongst themselves further adaptation initiatives for their communities. This method certainly supports local residents in strengthening their ability to adapt to adversity. Harvesting information from the local participants also helps M&E practices overcome challenges in terms of insufficient data at the grassroots level (Reid et al., 2015).

The example of Thai Binh shows us that the operation of the water supply plants under the World Bank's project worked better and more effectively than the government ones. The explanation given was that local residents in the project areas collaborated in terms of techniques, financing and monitoring during the project's implementation. For example, local residents commented on how the water supply facilities were installed in terms of quality, timeframes and other factors. Through community meetings, local residents were seen to be more willing to donate their land or to accept compensation payments for their land to be used for new water supply plants. The data for the outcome indicators, such as "number of people who adopted safe hygiene and sanitation behaviour" (see Figure 22), were also collected via surveys and local interviews.

Combining top-down and participatory modes of evaluation

The two approaches above can be conceived as top-down (theories of change) and bottom-up (local participatory evaluation). The first approach claims to rely on the "obvious" and "scientific" practices. In this mode, linear cause-effect principles, results-based

management and centralised administration are dominant. The second approach relies more on local knowledge, perceptions and “empirical” evidence. The classic combination of these two modes was applied for the World Bank project. As mentioned, the changes in the number of people suffering from water-borne diseases were not considered by the initial outcome indicators of the project. This indicator was only picked up after working with local residents via individual interviews and discussions during surveys, local meetings and other project activities. Information on local hygiene behaviours and the number of people with water-borne diseases therefore gave specific, convincing and explanatory evidence for positive claims on the key final outcome of improved health of the World Bank project (see Figure 22).

To produce “good” M&E results, evaluators, officers and other partners have followed scientific practices and worked as scientists. On the one hand, theories of change offer us assumptions, of which even those that are unpredictable and contingent at some point become manageable and controllable (Schwandt, 2002) or subject to future-oriented implementation (Fazey et al., 2018). The effects of interventions can also be logically and rationally predictable at given implementation stages as well as in terms of their long-term outcomes. In the context of climate change adaptation, baselines for CCAIs, particularly at local levels, are insufficient. Detailed local climate change scenarios and their potential impacts are not often available (Bours et al., 2015; Dinshaw, Fisher, McGray, Rai, & Schaar, 2014; Viggh et al., 2015; Villanueva, 2010). Theories of change therefore have been using the recall and reconstruction of the baselines of interventions and related contexts as well as predictions for ongoing scenarios. On the other hand, local participatory evaluation and behavioural change-based evaluation work as complementary to the specific information and empirical evidence for assumptions due to theories of change at the local level.

This instrumental rationality and scientific reasoning is believed to produce rigorous and legitimate results. For example, in combining theories of change and participatory evaluation, the M&E results in the World Bank project’s report have been considered to be analytical, rational and empirical. These results received positive feedback and were seen as convincing and sound in the report of the Independent Evaluation Group of the World Bank (World Bank, 2015). The project has indicated that the proportion of households accessing “improved water sources” (piped running water/household connections) surpassed the goal by 31.7% (World Bank, 2013) and was considered a success, which was even acknowledged

by the Vietnamese government. This project and its M&E practices have become a kind of model for the implementation of Vietnamese governmental interventions as well as other World Bank projects in rural water supply and sanitation (Nguyen Minh Chau, 2016; World Bank, 2013, 2015).

However, some knowledgeable evaluation theorists warn us of problems in applying scientific practices. For example, Michael Quinn Patton and colleagues emphasise the consequences of an overreliance on scientific methods that too often are applied narrowly and mechanically. As they write:

> Traditional evaluation [mainstream] approaches advocate clear, specific, and measurable outcomes that are to be achieved through processes detailed in a linear logic model. Such traditional evaluation demands for upfront, preordained specificity don't work under conditions of high innovation, exploration, uncertainty, turbulence, and emergence. (Patton, McKegg, & Wehipeihana, 2015, p. vi)

The traditional, scientific and standard methods for M&E applying in the World Bank project examplified for the statement of Patton, McKegg, & Wehipeihana (2015) above. . In the next sections I turn to exploring how these scientific M&E practices form the results or the scientific facts, as well as the fundamental problems and common pitfalls of current mainstream M&E practices, particularly for CCAIs.

3.3. Fact-making through scientific practice

One thinker who has approached the question of how we might "really know" what is going on in the world is Bruno Latour. Latour's work began in ethnographic observation of scientists in their laboratories, trying to understand how a scientific fact was discovered, or indeed, "constructed". In this way Latour is able to get at the limits of scientific facts and our ability to know anything about matter and reality. This will be important for my argument that our perception of monitoring and evaluation practices, particularly for CCAIs, needs to shift from a project of getting at the scientific facts of reality to creating possibilities that move toward solutions or creating knowledge to increase possibilities for solutions (I will expand on this argument in Chapter 6).

Latour and Woolgar (1979) observed and explored the ways that scientific facts are produced in the everyday operation of science and technology in the laboratory at the Salk

Institute for Biological Studies, California, in 1975. Their fieldwork included taking note of all processes and activities within this laboratory: the daily activities of scientists, secretaries, caretakers, deliverers, staff, and their lunch boxes, apparatuses, machines, animals for experiments, printers, blackboards, computers, tablecloths, tubes, potions, chemicals, graphs, scientific experiments, discussions of results, personal gossip, and so on to the final academic scientific publications.

Based on these inclusive field notes and observations seen through an outsiders' lens in a new environment, Latour and Woolgar state that scientific facts from these laboratory practices are both materially and socially constructed. Within the laboratory, discussions, negotiations and determinations by which scientists consider whether a substance is "new" or just transitory is a process by which something finally gets to be perceived as scientific fact or reality. They point out the processes involved, including juxtaposition, inscription, discrimination, deletion, isolation, purification, construction and finally definition for the emergence of a scientific fact. That particular scientific fact is constructed through these processes and networks of **"**inscription devices" that exist both within and outside the laboratory and consist of apparatuses and technicians. Without the material system of inscription devices, that particular scientific fact or knowledge on the "new substance" cannot exist (Latour and Woolgar (1979).

Scientific fact is not only materially constructed, Latour and Woolgar (1979) argue, but also socially constructed rather than "something which is simply recorded in an article" (p105). Even though scientists believe that the scientific facts are very solid, objective, immutable and legitimate. They, as human beings, also work, gossip, communicate and worry about the future. They have been definitely influenced by the cultural and social aspects and mundane sentiments of ordinary life. It is because "out of their work, their practices and their beliefs, they produce knowledge, scientific knowledge, accounts of reality" (Law, 2004, p. 19). The scientific facts therefore have gone through processes based on "extensive heterogeneous networks" (Blok & Jensen, 2011, p. 50) affected by social and cultural contexts; yet, too often these references in relation to material and social construction in any scientific facts have been erased from our views (Latour & Woolgar, 1979; Law, 2004).

By the same token, M&E results based on scientific practices are materially and socially constructed. In order to illuminate this argument, I look at how the M&E results of the

World Bank project are constructed. I argue that they do not only come from material data and information itself; rather, they are constructed through the scientific M&E practices mentioned in the previous section.

Many materials, processes and activities are involved in the construction of the M&E results indicated in the World Bank reports. All information—including the data from surveys and local interviews on public health, poverty conditions, water supply, hygiene facilities and so forth—was collected, juxtaposed, inscribed, discriminated, isolated, purified and allied. Many actors and factors take part in these processes. For example, there is not only the material representations such as water samples, income sources, water supply and hygiene infrastructure and the conditions of local sanitary systems, but also survey structures and tools carried out by project staff or Vietnamese government officers, as well as the skills of technicians, interviewing cultures and others. Also, while it is not uncommon to carry out focus group discussions and individual interviews in Vietnam, interviewers and facilitators are often accompanied by government officials, meaning that participants will be inclined to respond according to what they think officials want to hear. These social and cultural factors and actors also belong to complicated, dynamic, relational and uncertain networks (e.g., incompetent technicians' judgement on local hygiene behaviours, or the political interests of local officials who accompany during the interviews).

Different technical methods are applied for confirming particular results, and these must produce strong evidence within pre-judgements related to an issue. An example is red eye disease, with some questions: Is the decrease in the number of local people suffering from red eye disease due to the increase of the number of the households accessing improved water sources? Has this result been recorded not only in one community by happenstance but rather repeatedly and also acknowledged by local responses? Is this confirmed by statistical evidence? However, the statement that higher numbers of households accessing improved water sources correlates with lower numbers of local people suffering from red eye disease is supported by statistical evidence. In the following statement the correlation between clean water and a reduced incidence of water-borne diseases was acknowledged and accepted as scientific fact:

> The people who live in the households with unhygienic main water sources have a risk of diarrhoea from 1.01 to 1.49 times higher than those living in the households with hygienic main water sources. (Nguyen Minh Chau, 2016, p. 6)

It is sure that it is not only clean water that can ensure lower incidences of water-borne diseases, and there might have different notions on the extent of clean water. This begs the question of how we can really "know" about hygienic water sources, applying in M&E for this particular project. Determining whether a particular water source is hygienic or not depends not only on scientific criteria but also on the professional skills and personal perceptions of independent evaluators as well as World Bank staff and officials. The Ministry of Agriculture and Rural Development (MARD (2012) clearly lays out the criteria for hygienic water sources: shallow wells and drill wells must be well distant from potential pollution sources; roofs and tanks must be clean before taking rain water; water from these sources should also be odourless, tasteless, colourless and transparent. However, what distance is perceived as far enough? How clean is clean enough for a particular household's roof and tank? Too often these criteria are decided according to personal perception. There is inconsistency in assessment incidents and those in charge. Technical methods and their practice is, to a certain degree, affected by social and material contexts influencing technicians and practitioners.

In short, in order to achieve good M&E results that are legitimate, M&E practices should be analytical, robust and empirical; many scientific practices have been praised and applied to M&E of CCAIs. However, all scientific practices and processes are to some extent influenced by social and material contexts. This means the M&E results generated through mainstream scientific practices are not as objective, defined and indisputable as we often perceive them to be; rather, they are socially and materially constructed.

So what does this mean for our understanding of the role of M&E regarding CCAIs? In the following sections, I tease out how the processes of social and material construction relate to the realities of the effects of water-related CCAIs through current mainstream and scientific M&E practices.

3.4. Amplifying and performing realities through practice

From the preceding sections, we understand why scientific modes have dominated current mainstream M&E practices of CCAIs. We have also gained a glimpse into the processes whereby these practices constitute M&E results or scientific facts. In this section, I examine the common approaches that lead to fundamental problems with M&E results. These are the use of static indicators, an overemphasis on measuring and judging the merit/effectiveness and worth/efficiency of interventions, and finally the dissection and disengagement of evaluands[16] from their forming contexts. From this, we can gain a better understanding of the limits and challenges of current mainstream M&E practices.

First, I argue that indicators that seem to be the most appropriate tools for achieving robust M&E results (tools that are presumably scientific) cannot capture the realities of the dynamic and complex impacts of the CCAIs. Indicators stand for changes associated with an intervention or assessments of the performance of a development actor (OECD, 2002). In the synthesis report on current M&E frameworks for CCAIs published by Bours et al. (2013), 21 out of 22 current frameworks consist of particular sets of indicators or guidelines for developing indicators. Without indicators, evaluation results may not reach the community; “the effects of the use of indicators are becoming so strong and pervasive” (Moed, 2018, p. 4). Applying indicators within interventions’ management cycles for visibility and transparency is widely accepted. However, the Oxford English Dictionary defines an indicator as “[a] thing that indicates the state or level of something”. An indicator, therefore, cannot manifest processes, especially the effects of CCAIs that are often processual, dynamic, active and changeable. Applying static, deterministic and quantitative analysis, including indicators for evaluating the dynamic and volatile impacts of CCAIs, can create biased, skewed and even misleading M&E results.

For example, the National Target Programme (NTP), mentioned in page 48, develops, for example, the indicator on the number of people accessing improved water sources. The data for this indicator is collected by officials at the community level, then aggregated and reported to the national office annually. The water samples are collected around October and

[16] Evaluand is “the subject of evaluation” (Uitto et al., 2017, p. 6) or “the thing being evaluated” (Patton, 2015, p. 9).

then reported to higher administrative levels in subsequent months (MARD, 2012). This means that water samples are collected only at specific times. However, water quality, particularly groundwater, is highly changeable in the actual conditions of climate change in rural areas, particularly in coastal areas like Thai Binh province. The dry season often starts in November; however, in some recent years there have been storms and heavy rain in mid-November, which apart from other adverse impacts have led to good-quality groundwater in coastal areas. This means that while the data for the number of people accessing improved water sources is static, the improved water sources that this indicator is meant to represent are changeable and uncertain. This indicator thus cannot represent or indicate for changes in groundwater resources.

Second, an overreliance on measuring and judging the efficiency and effectiveness of CCAIs leads to biased results, which might mislead ongoing adaptation. Focusing on the effectiveness and efficiency or on the accountability of a particular intervention is necessary to know whether these interventions have achieved the outcomes and impacts according to particular assumption. Effectiveness focuses on achieving target objectives. Efficiency concerns are more about cost-benefit analyses, which include transaction costs, the costs of inaccurate prediction and any benefits from reducing adverse impacts or capitalising on potential opportunities (Adger et al., 2005; Hedger et al., 2008; Villanueva, 2010). For the policy makers, researchers, donors, NGOs and others working on climate change adaptation, revealing scientifically the effectiveness and efficiency of interventions can allow them to make rigorous and evidence-based claims of success.

Yet too much focus on the effectiveness and efficiency of interventions may lead evaluators, project staff and government officials to easily prioritise the effects of particular aspects and adaptation perspectives while ignore others. The effects of CCAIs are complex, dynamic and multiple. There is also a long and controversial conversation on climate adaptation, which makes it more difficult to judge how and what CCAIs can be considered as effective and efficient (indeed, as successful or failed) (Adger et al., 2005; Adger et al., 2009; IPCC, 2008; O'Brien, 2012; Pelling, 2011). For example, interventions following social transformative perspectives can be claimed as failures by scholars who favour the conservative perspective of CCA that emphasises economics, engineering and technical solutions.

To measure effectiveness and efficiency, evaluators often presume the effects of particular interventions as end outcomes or as reaching the end of the process. This provides a simple "end" for a particular intervention or at least the "official" end for the effects. However, interventions have ongoing effects. As a consequence, focusing on effectiveness and efficiency does not allow us to recognise other possible outcomes and ongoing or developmental effects that might not yet be explicit. The example of the World Bank project in Thai Binh illustrates this argument.

This project has been widely legitimated and acknowledged by Vietnamese governmental organisations and World Bank agencies outside Vietnam. With a financial budget cap, World Bank (2015) stated that their projects have satisfactory final outcomes, but many local residents have a different assessment of the impact of this project on their lives. Approximately 255,000 households were connected to new water pipes, and 1.2 million residents gained benefits from this project (World Bank, 2013). These statistics are attractive and satisfy not only the World Bank as the principal donor but also the Vietnamese Government and other donors. According to the report from the Provincial Panel of the Management Unit (PMU) of Rural Fresh Water Suppy Facilities (2016), all water plants established by the World Bank are working well. The World Bank claimed that there are four provincial enterprises covering 87 schemes (*nhà máy nước*/"water plants") have been installed that could ensure water supply for 100% of local residents in target areas (four provinces). However, working in the fields in my hometown and connecting with local participants, my observation has been somewhat different to this "official reality". The "other realities" I have found are not manifested in any government documents or independent M&E reports. The wider public also does not recognise them. What are these "other realities"? Within the research sites, a household being connected to water pipes does not necessarily guarantee reliable access to sufficient water. The following local responses reflect this:

> We can only access piped running water once or twice per week. It is insufficient. It would be great if we could access at least 5m^3 per month. (1T1, 21st June, 2016)
>
> My household can access piped running water but it only meets 40 percent of our demand. (1H3, 17th June 2016)
>
> During the construction of the local main road, our piped running water pipes were broken. We could not access this water for two months. (1H2, 21st June 2016)

In addition, there are ongoing impacts associated with the operation of these water plants in the Thai Binh area. After the World Bank project's completion, some water plants raised water prices in particular areas, especially in remote areas. Rural residents also have to pay extra fees to access this water as they are often at long distances to the public pipe systems; urban area residents do not pay these extra fees. Water prices in rural areas are also higher than in urban ones. In order to access clean water, some of these residents thus must reduce their budget for other daily necessities. Participants comment:

> Apart from paying more than 2.700.000[17] VND for to connect to local piped running water supply pipes, we pay 8.000 VND per cubic meter while the urban residents only need to pay around 7.000 VND per cubic meter. This makes our fiscal condition more difficult. (2B, 8th June 2016)

> The poor in our community are reluctant to use piped running water as it is too expensive. (2T, 3rd June 2016)

> In order to access the piped running water system, my household has to commit a lot of money…It is not easy for us. (1BL, 5th July 2016)

A sense of inequality and unfairness can also be seen between the residents who were able to afford new piped running water services and those who struggle for this kind of necessaries:

> It is very sad for rural residents like us. You guys living in the urban areas can pay lower prices for your water. You also do not need to pay to connect to the piped running water supply systems. We here (in Nam Hung) have to pay extra for that. It is not fair for us. …Also the prices even go up over time. So the poor cannot scrape together enough money and also have to pay extra. As a result, they have more difficulties and financial issues. (2B, 8th June 2016)

An overemphasis on efficiency and effectiveness thus seems neither efficient nor effective. The social impacts of the projects are very obvious; however, the M&E done for the World Bank project cannot represent and reveal these ongoing social impacts. There

[17] This amount is equal to the average monthly salary for workers in some urban areas. It is also equivalent to around 500 kg of rice, for which one household needs to work for 6 months on 1.000m^2 (3 sào Bắc Bộ) of land.

is a blind spot in the areas of financial inequality, the lack of maintenance services and the administrative bureaucracy.

Third, there is the sense of disengagement or attitude of objectivity cultivated by M&E practitioners. Evaluators are aware of the possibility that they as subjects might influence M&E results. They notice the phenomenon that “whether a particular indicator is better or worse, there is no systematic way of deciding among indicators which are equally good or bad” (Winderl, 2005, p. 47); even though they are based on scientific indicators and practices. Thus, there is a de facto rule within the M&E community that evaluators have to keep a certain distance from their evaluands. Evaluators often presume the need to be objective and explicit about the evaluands (Moed, 2018). This is even endorsed for local participatory M&E practices that mainly elicit data from local responses and perceptions. For example, a particular facilitator can be a local resident, but donors often set specific work standards for these facilitators. He/she should, at the local sites, work neutrally to encourage discussion and draw out contributions from various stakeholders, but he/she is not allowed to contribute to the content of local conversations (CARE, 2014). Adopting such a disengaged and objective attitude, practitioners believe that they can evaluate and monitor particular evaluands in an unbiased, transparent and legitimate manner (Schwandt, 2002). They can feel somewhat confident that they are scientifically legitimate in their practices for their M&E decisions (Schwandt, 2002). However, as mentioned on previous section, the culture, political interests and others also influence practitioners in carrying our their chosen practices. The stance of being disengaged and objective to evaluands, might thus lead to representing incompletedly reality.

A final problem with current M&E practices is the habit of cutting things from contextual conditions into bits and pieces for better understanding and gathering them into a “new” whole understanding. In other words, the outcomes or the effects of particular interventions are often detached from their forming contexts. Thus, there is lack understanding of how these effects takes place (Villanueva, 2010). Yet, the realities of the effects of the CCAIs are complex, dynamic, relational and uncertain, particularly at the grassroots level, for example the local realities in relation to water-related CCAIs mentioned in Chapter 2. To deal with a “thing” that is complicated, vague and unpredictable, it is common to dissect and unpack them in a rational, critical and logical way for better seeing and understanding. This is a “bad habit of

the modern ethos, of the impulse to crack things open… a gusto for purist dissection, coupled with the dismissive othering of those who do not dissect" (Puig de la Bellacasa, 2017, p. 32).

The more emphasis we put on scientific practices, the more we put the object that we need to confront into a "pure" condition where this object should be logically and rationally anatomised and disconnected from others. This stance is easily pointed out in theories of change with outcome-based and results-based evaluations, local participatory M&E and the mixed approach mentioned earlier. In Figure 22 of the World Bank project, for instance, outcome-based, processes-based evaluations help evaluators, officers and other partners unpack and dissect all the information related to particular indicators at given stages. By the same token, the organisations following local participatory evaluation often implement their M&E practices based on different groups such as according to gender, age, occupation or local concerns and priorities. The elicited data, then is analysed separately, according to particular themes.

This modern habit can lead to misleading M&E results. To explain why this is possible, I draw on the example of two households in my case studies in dealing with a specific plant disease epidemic in Nam Hung. In 2017, the summer rice crop was affected by the southern rice black-streaked dwarf virus (*bệnh Virus lùn sọc đen*)[18] in the area surrounding Nam Hung. Local farmers had to apply a large amount of pesticide to protect their crops. Two householders, Mrs. Loi and Mrs. Hoi, who grew crops in the same paddy field in Nam Hung, exemplify the effects of this epidemic on their crop mass. Both their crops were grown in similar soil and had a similar quality of seeds, labour skill and irrigated water control. Both were affected by this disease epidemic. At the end of cropping, Mrs. Hoi's household harvested significantly more rice than Mrs. Loi's did. When I asked both women for their feelings about their crops, Mrs. Hoi, though her household harvested more rice than Mrs. Loi's, was not satisfied with this summer's rice because she had needed to apply considerably more pesticides than usual to achieve it. This means that Mrs. Hoi's success can only be claimed if it is taken out of the context of the high health and environmental risk to achieve it. In contrast, Mrs. Loi, although sad about not harvesting the quantity of rice she expected, still evaluated positively her own farming activities during this disease epidemic. This is because she did not

[18] Chapter 5 will explain more detail the effects of this incident on local livelihoods.

apply a lot of pesticides and had therefore protected her rice from serious contamination from poisonous chemicals as well as her land and health. As has been seen in this story, if we dissect out environmental and health issues in examining the success of the crop mass, Mrs. Hoi's household, which used a lot of pesticides, comes out looking like having achieved a successful result. This M&E result also eliminates or marginalises local concerns for the environment and their health.

What is apparent by now is that under a scientific ethos, current mainstream M&E practices do not reveal the completed realities, particularly on the ground. Scientific practices or current mainstream M&E practices more or less amplify and perform what it can "make sense" of, which makes some particular realities "realer" and others "less real" (Law, 2004). For example, the reality of the success of the World Bank project becomes realer through robust scientific indicators). In contrast, the local concerns about financial inequality become questionable and "less real" under the scientific ethos.

So, what if we accepted that theories of change, objectivity and distance are illusions, that we can never really claim that our indicators and M&E processes get at "the reality" of the situation? What then would M&E look like? In addition, when we get to the end of objectivity, we begin to get at politics. So then, what are the politics in M&E, in indicatorism? What is performed or enacted by these processes? And how does this enactment or performativity relate to flows of power? Is it the case that more powerful organisations' realities come to be performed in ever widening contexts until they overtake and subsume the realities of local people? It is my contention that this is what is happening in the case of M&E of CCAIs in Vietnam. I discuss this in what follows.

3.5. Establishing facts through practice

Current mainstream M&E practices follow scientific practices in order to turn "raw materials" into "scientific facts" within "the laboratory". Yet those facts do not just reveal the realities (Latour, 2004c, 2014); they also contribute to *forming* the realities. Law (2004, p. 4), in his provocative argument on using conventional methods within social science, states, "[W]hen we are put into relation with such methods we are being placed, however rebelliously, in a set of constraining normative blinkers. We are being told how we must see and what we

must do when we investigate". And then, "in its practice science *produces* its realities as well as describing them" (Law, 2004, p. 13).

In the case of indicatorism, indicators do not only represent changes in the evaluands. They also have "their own political effects in motion" (Dahler-Larsen, 2014, p. 983) to create realities. Indicators interpret and define the landscape of meaning, merit, worth or significance of evaluands. In addition, it is common that "when people react to an indicator, they may find out how to make sense of the construct that the indicator claims to measure" (Dahler-Larsen, 2014, p. 975). By this means indicators can "change the way in which researchers and evaluators perceive reality" (Moed, 2018, p. 2), in this way establishing realities. Indicators are thus not just neutral and untouched tools or objects; they affect how people define the concepts of what we want to measure (Dahler-Larsen, 2014).

To illustrate how the usage of indicators in daily lives or indicatorisms affect the interventions they mean to evaluate, Dahler-Larsen draws on the example of waiting time at a hospital in the Netherlands. The indicator of time spent in the waiting room is used for monitoring and evaluating the operation of this hospital. In order to improve this indicator, staff moved some chairs from the waiting room to the hall. Before going to the waiting room, patients have to wait in the hall. This means that while the patients' real waiting time at this hospital is unchanged, the amount of time spent in the actual waiting room is reduced. Similarly, in Thai Binh, I was shocked when one of my participants showed me a concrete canal in her community that connected the big river to "nowhere", that is, to one large private pig farm, instead of distributing irrigated water to many fields and supporting a number of farmers. Such an occurrence is because to achieve a high number in the indicators of new concrete irrigation canals under the New Rural Programme (mentioned in Chapters 1 and 2), local officials do as much as they can to get more concrete canals built regardless of their usefulness or efficiency. Putting aside bureaucracy and corruption issues, such indicators do not present objective changes due to particular interventions or actions. The use of these aforementioned indicators is logically encouraged for representing and measuring desired outcomes; however, within implementation and performance, to some degree it creates what it meant to measure.

The process whereby scientific practices consistently *form* the realities, in between there is the process termed "universalisation" by STS scholars Star and Griesemer (1989). .

Many actors and factors have worked collectively for the consolidation of these realities. As they state:

> [S]cience requires cooperation—to create common understandings, to ensure reliability across domains and to gather information which retains its integrity across time, space and local contingencies. This creates a "central tension" in science between divergent viewpoints and the need for generalizable findings. (Star & Griesemer, 1989, p. 387)

Through this process, there are emergences of "common" understandings or "generalisable" findings among related parties or involved things, which then become realities. Similarly, Schwandt (2002) argues that M&E practices, within the process of making M&E decisions, somehow seek the "agreed-upon knowledge" and mediate for less conflict amongst many involved parties, even with participatory evaluation.

I now move to illustrating how our practices and all other involved things work collectively and collaboratively to form "generalisable" findings or agreed-upon knowledge via the implementation of the World Bank project for better domestic water provision in the province of Thai Binh. The results of these process then become realities in terms of water for locals. In many Vietnamese regulations and reports, the term *Nước sạch*/"clean water" has been clarified as water that has been treated and whose quality surpasses the national standard QCVN 02: 2009/BYT issued by Ministry of Health dated 17th June 2009 to meet domestic demands (Prime Minister of Vietnam, 2000). However, the term "clean water" too often refers piped running water in government campaigns and official documents. Many training courses and workshops have been implemented to persuade local residents to use public water supplies instead of their traditional water sources such as rainwater, surface water and groundwater. Governmental agencies have even confirmed the inappropriateness of these water sources in Thai Binh. For example, the director of the Department of Environment and Natural Resources, one of the most reliable sources in terms of environmental issues, states that groundwater in Thai Binh is laden with heavy metal elements, which may harm human health (Thu Hoai, 2017).

In addition, the indicators themselves constitute the local perception of clean water as public running water supply. A World Bank indicator/objective is to improve local hygiene behaviours, for which they implement many training courses and workshops and disseminate information and pamphlets that advocate for piped running water. Evaluators or people who

are in charge of collecting these indicators too often perceive the number of local residents using piped running water for their daily activities as the number of those who have adopted safe hygiene and sanitation behaviour. They often value piped running water as the cleanest and most reliable source, while other water sources become inappropriate or slightly unclean. But this is not necessarily of the case.

Political will also plays an important role in forming this perception on piped running water. The Thai Binh provincial government has set up an ambitious political objective of 100% of local residents having access to clean water. The number of people having access to piped running water becomes the primary indicator for M&E of every intervention in terms of rural water supply, including the World Bank project and those of the NTP. Achieving a high value for this indicator is not just official duty but also to some extent political fate for local officials (Hai Dang, 2018).

What this means is that the *indicator* for clean water, which is number of people connected to the public water supply, is now being understood as the *definition* of clean water. When I ask local residents and officials how they manage to have sufficient clean water for domestic activities, all of them automatically respond in regards to being connected piped running water which is publically supplied by the World Bank project or the NTP. There is even political praise for households that have destroyed the cement tanks they used to store rainwater for drinking in rural areas in Thai Binh - despite the fact that these are not inherently unclean and could be tested on a case by case basis. Also, young families are currently not keen on traditional water sources (surface water, rain water and groundwater); they prefer piped running water for their domestic use. The realities in terms of piped running water are crafted by all these practices.

Regarding climate change adaptation, this overemphasis on piped running water dismisses, ignores and even seriously limits other water sources. Even if these waters are might contaminated with heavy metals or is not safe to drink, they can be used for other purposes such as having bath, washing clothes, or flushing toilets. Households that destroyed their cement tanks will no longer be able have access to rain water, which is an important water source in the dry season and as well as back-up in case of insufficient piped running water or broken supply facilities, as mentioned earlier. Indeed, this scenario is quite common in rural areas of Thai Binh. There is currently no piped running water supplied in some coastal

communities, and even locals do not know when they will be able to access it (Duy Hung, 2019). Thus, too great focus on piped running water for adapting to water scarcity has unwittingly undermined other local adaptive capacities.

In short, our practices of M&E will assemble or work collectively with other involved things to contribute to particular realities (Law, 2004); however, these realities might not be what matters most for the people we set out to support via our evaluation. In the example of waiting time in the hospital in the Netherlands, official reports show a decrease in the amount of time spent in the waiting room, but this reality does not matter for patients. Similarly, the indicator of kilometres of concrete canal led to a reality of an improved irrigation system according to official reports, but this does not mean that these canals are effective in supporting local farmers in Thai Binh province. The example of achieving objective in terms of public water supplies are similar.

More importantly, M&E practices form particular realities that were actually pre-ordained objectives of the interventions, and these objectives need to be monitored and evaluated. The process of forming reality around piped running water in the World Bank project typifies this. The M&E activities for the project worked in same way as any other development programme, supporting the project in achieving its objective of 100% local residents accessing clean water (in particular piped running water) in Thai Binh. The M&E practices turn themselves into a kind of development programme for supporting the effectiveness and efficiency of interventions (Dahler-Larsen, 2014; Schwandt, 2008; Wouters, 2018).

3.6. Conclusion: “Matters of fact” and a realist approach to doing monitoring and evaluation

A question for scientific orientation

In this chapter, I addressed the questions raised in the conclusion of Chapter 2 about how our values, attitudes and practices affect M&E decisions or outcomes of particular interventions. In the same tone, this chapter has specifically answered the third research question, that is, in what ways do our M&E practices affect our M&E results for water-related CCAIs? This chapter thus examines the means or practices applied for knowing about realities in relation to water-related CCAIs.

To achieve this I first reviewed mainstream M&E practices commonly applied in Vietnam. There is no doubt as to the scientific orientation of these practices, which lead to analytical, robust and legitimate M&E results. For example, theories of change have been applied for managerial and controllable interests regarding the uncertainty, unpredictability, long time horizon and dynamicity of climate change impacts and well as the effects of CCAIs. Similarly, local participatory evaluation has been applied flexibly as a bottom-up approach focusing on behaviour-based and participatory evaluation or combined with top-down management for a mixed approach for specific and empirical evidence of changes.

However, through an anthropologist's lens, this chapter has also argued that M&E results are socially and materially constructed. Static indicators are dominant in many M&E projects, which leads it to being impossible for M&E results to represent dynamic and uncertain effects. The indicator of number of people accessing improved water sources has served to demonstrate the limits of the World Bank's M&E reports on the uncertainty and dynamicity of water sources in coastal areas. Current M&E practices also place too great emphasis on measuring and judging the effectiveness and efficiency of particular interventions, which leads to biased and misleading M&E results. This perspective has unwittingly ignored the long-term and ongoing effects of CCAIs. The chapter has also pointed out the pitfalls of adopting an objective or disengage perspective with respect to evaluands, and the habit of dissecting things and holding them as *pure*. These kinds of perspectives sever evaluands from their relational networks which in fact consist of many other influencing factors and actors.

In short, rational, scientific and analytical M&E practices focus too much on trying to measure and judge whether effective change has happened when it seems that they do not have access to anything close to the local reality. Current mainstream M&E practices such as the measurement of indicators, theories of change for assumptions at hand, objectivity and distance, abstraction or oversimplification, and hyper-rationalisation all limit us to the multiplicity and complexity of realities. They narrow our vision such that we cannot perceive local realities that are not based on our indicators. Independent evaluators and experts who claim to be apolitical cannot see other realities: the inequality and insufficiency of water services from the World Bank project, the uncertainty of water quality in the context of climate change, the biased claim of success for households with a bigger harvest but that has applied a greater-than-usual amount of pesticides and other agro-chemicals, and so on.

This anthropological investigation into current mainstream M&E practices has questioned our faith in scientific utopia of doing M&E. From the discussion so far in this chapter, there is a need for evaluators, officials and NGO staff to step back and reflect before launching their scientific M&E methods or practices. This is the first chapter's main argument. It is also a contribution of this thesis to the current conversation on how we should do M&E differently (Ofir, 2018a, 2018b), a topic I return to in Chapter 6 for further practical recommendations.

Thinking with matters of fact and realist approach

What is apparent by now is that current mainstream M&E practices try to achieve accuracy, legitimacy and professionalism to represent the effects of CCAIs as reality, and that they are all theory-driven. Pawson, Greenhalgh, Harvey, and Walshe (2005) call this kind of M&E stance a realist approach that believes interventions are "theories incarnate". The core idea of the realist approach is our possibility for working towards a better understanding of how the effects of interventions come about as reality, or what really happens. Via adequate testing and experimentation using complex and multiple methods evaluators are able to identify mechanistically configurations of any effect of intervention within particular contexts (Astbury, 2013; Hewitt, Sims, & Harris, 2012; Pawson, 2013; Pawson et al., 2005).

Latour calls this thinking in doing our practice "matters of fact". He then states that "[r]eality is not defined by matters of fact. ... Matters of fact are only very partial and, … very polemical, … only a subset of what could also be called states of affairs." (Latour, 2004c, p. 232). The M&E results of the World Bank project examined above are such scientific facts and just some aspects of the whole picture of domestic water issues that require addressing in an effort to adapt to climate change.

Law (2004), in the similar perspective, explains how we perceive reality from our experiments, indeed scientific experiments, as follows:

> [S]cientific experiments make no sense if there is no reality independent of the actions of scientists: an independent reality is one of the conditions of possibility for experimentation. The job of investigator is to experiment in order to make and test hypotheses about the mechanisms that underline and make up reality. (p.140)

At this critical point, a realist approach in doing monitoring and evaluation, or theory-driven evaluation and thinking with “matters of fact” seemingly considers the effects of interventions or realities as somehow defined, independent to evaluators’ actions and always within particular mechanisms, even taking the influence of humans (including evaluators) into account. Pawson et al. (2005) consider the influences of evaluators or participants as the forming of social contexts; but these contexts are defined, independent and predictable via hypotheses (Astbury, 2013; Blamey & Mackenzie, 2007; Hewitt et al., 2012; Miyaguchi & Uitto, 2017; Pawson, 2013; Pawson et al., 2005).

Yet, this chapter has shown that there are many factors and actors influencing M&E practices and that they are complicated, undefined, uncertain and dynamic. Also, the implementation of current mainstream M&E practices always has a political dimension in forming realities. M&E practices make some particular effects realer and others less real. Thinking with “matters of fact” or a realist approach in doing M&E apparently cannot lead us to know the full effects of CCAIs as it should. We still do not know well how water-related CCAIs enact on the ground. We thus need an alternative (what I call in this thesis a realistic approach) to enable us to know better the effects of CCAIs and thus be able to do better CCA (Chambers, 2017). This is my second argument in this chapter.

So, if we now know that we cannot rally around the project of making M&E for CCAIs more scientific, what then? If we should not rally around the realist project and its focus on measuring the worth, merit or significance of particular interventions against analytical, rational and legitimate criteria, what then?

Put another way, M&E practice seemingly never gets to the end of realist representations of the effects of intervention. Our M&E practice is also always a sort of an intervention for particular realities anyway, whether we like it or not (Latour, 2014; Law, 2004). This also means that there are always chances that we will produce particular realities via doing M&E. So, if M&E is more than just measuring the effectiveness or efficiency of particular intervention, why would we craft deliberately more meaningful and significant realities in climate change adaptation via doing M&E differently? This is my third argument in this chapter.

In short, these three arguments are realistic, and can be understood as an actionable recommendation for evaluators. Practitioners first should press the pause button on their

common thinking that takes scientific practices as the first and best option. They then should strongly consider alternatives or imagine differently to find suitable M&E practices for their M&E projects. Lastly, they should believe in the possibility that they can deliberately contribute to forming particular realities that are M&E outcomes and then ultimately particular solutions in terms of climate change adaptation.

I consider these three arguments as pathways leading us to alternatives to developmentalist CCAIs (mentioned in Chapters 1 and 2) and their M&E practices. This is also an idea that Bruno Latour and other STS colleagues advocate for in social sciences research (Blok & Jensen, 2011; Callon & Rabeharisoa, 2003; Latour, 2004c, 2014; Law, 2004; Puig de la Bellacasa, 2017). My intention for the next chapter is thus to further examine the work of STS scholars, particularly their recommendation for a scholarly move from “matters of fact” to gathering ourselves around what they call “matters of concern”. This is an alternative scholarship that perceives differently involved things that form realities, and also encourages practitioners to participate in opened conversations negotiating the crafting of other realities. This alternative scholarship is also considered as a *realistic* approach to doing M&E since it does not merely emphasise on the interpretation and representation of the effects of CCAIs but rather manifests potential possibilities, or at least contributes to creating knowledge that increases the possibilities for what we want to achieve via our work.

CHAPTER 4

AN ALTERNATIVE TO MONITORING AND EVALUATION: THINKING WITH "MATTERS OF CONCERN"

> "I like to say that there is no scientific method as such, but that the most vital feature of the scientist's procedure has been merely to do his utmost with his mind, *no holds barred*."
>
> —(Bridgman, 1946, p. 144, emphasis in original)[19]

> "We are doing more than asking what can be built. We are engaging in a *philosophical discourse about the self*—about what we can do and what can be. Tools are fundamental to action, and through our actions we generate the world. The transformation we are concerned with is not a technical one, but a continuing evolution of how we understand our surroundings and ourselves—of how we continue becoming the beings we are."
>
> —(Winograd & Flores, 1986, p. 179, emphasis added)

[19] Percy Williams Bridgman won the 1946 Nobel Prize for Physics.

4.1. Introduction

M&E practitioners are stubbornly attached to a realist approach, seeking to answer whether something is real, accurate, true or not. Chapter 3 examined this realist approach or "matters of fact" scholarship, in doing M&E of CCAIs. It drew attention to our limits in terms of knowing what really happens and representing the effects of CCAIs as realities under uncertain and unpredictable contexts. In particular, we cannot answer the question of how much we can *really* know about climate change and to what degree of accuracy. Primarily occupied with establishing matters of fact, practitioners also contribute to creating other realities. Current mainstream M&E practice for CCAIs are thus fraught.

So, if focusing on "matters of fact" indeed makes it difficult to get at the heart of the issues we are concerned with how might we be more open to the practical possibilities to doing M&E differently? How might a *realistic* rather than *realist* attitude to monitoring and evaluation help us?

This chapter thus aims to imagine an alternative that follows a realistic attitude, which in turn might help M&E of CCAIs to overcome the pitfalls (identified in Chapter 3). In doing so, I follow the recommendation of Latour (2004c, 2005) for a shift from "matters of fact" to "matters of concern". This chapter first examines STS-scholarship of "matters of concern", applying it to the context of doing M&E. Unlike thinking with "matters of fact", which seeks to document the reality, a "matters of concern" scholarship focuses on the gathering that forms reality, then on identifying what matters concern us in that gathering. The chapter then explores lessons learnt from the work of some scholars who think with "matters of concern" to successfully bring into being some alternatives within their study areas. Third, I open up the process whereby I have reached the tipping point of shifting from "matters of fact" to "matters of concern" in my own PhD project. This scholarly move indeed is a process of re-subjectification whereby my subjectivity becomes the subject of my own PhD project. This re-subjectification offers me a new pair of spectacles to know about the effects of water-related CCAIs on local livelihood realities. The chapter thus carries out this thesis' third experimental approach for knowing reality. This knowing is different to what I have known based merely on the SLA mentioned in Chapter 2. I thus propose integrating an embodied approach into doing M&E of CCAIs. This approach is an alternative to conventional M&E and also is considered

as the second wave of methodology for this thesis, that is different from the conventional methods and activities applied in social sciences mentioned in the section 2.3.

4.2. Thinking with “matters of concern” for a realistic approach

As discussed, the scholarship of “matters of fact” focuses on abstraction, and among social scientists especially on social and material construction, which, in fact, cannot be separated from any phenomena, even in very objective and technical scientific projects. Bruno Latour thus pushes us to consider that focusing only on establishing “matters of fact” leads to “totally implausible, unrealistic, unjustified definitions of what it is to deal with things” (Latour, 2004c, p. 244). I presented cases exemplifying this in doing M&E in Chapter 3. He then urges us to deploy a different form of scholarship which he calls “matters of concern”. This section thus lays out explicitly why this scholarship can help to form a non-realist (what I call here realistic) approach to doing M&E better. I thereby seek to avoid the pitfalls mentioned in Chapter 3. There are two main points to make regarding thinking with “matters of concern” for a realistic approach.

First and foremost, in thinking with “matters of concern”, we consider the involved material things as lively, which takes into account their associations, negotiations, relational networks and politics in forming any phenomena or realities. A realistic approach here is a possibility for us to join in with these associations, negotiations and relational networks to form particular realities. In particular, **“**matters of concern” advocate for the “inclusion of things in politics”, or “thing-oriented politics” (Puig de la Bellacasa, 2017, p. 34). This means that all things nonhuman and those that may be invisible, elusive or ephemeral, are accounted for in the process(es) of forming any phenomenon. They all have rights and voices for speaking, contributing, distributing and voting for any emergence of a phenomenon within the parliament of things (Blok & Jensen, 2011; Latour, 2005, 2014) or “democratic assembly”. For example, in the case of the Salk Laboratory, they are all substances, elements, apparatuses and technicians involved both directly and indirectly, and more importantly are treated equally within scientific practices (Latour & Woolgar, 1979).

As Latour (2005) states:

> A natural world made up of matters of fact does not look quite the same as a world consisting of matters of concern […] It is still real and objective, but it is livelier, more talkative, active, pluralistic, and more mediated than the other. (p.115)

Thinking with "matters of concern", realities are formed not only by static, solid, singular, defined or inert *objects* but also by talkative, active, pluralistic and mediated things. *Things* are not "too hard, too technical, too real and too remote from human and social interest" (Latour, 2005, p. 95) but rather are imbued with liveliness. Indeed, they are "lively things", as put by Puig de la Bellacasa (2017), or "vibrant matter", according to Bennett (2010), and *actants*,[20] to Latour (2004c, 2005, 2014). They are always outgoing, energetic and enthusiastic in affecting other entities. They "ha[ve] efficacy, can *do* things, ha[ve] sufficient coherence to make a difference, produce effects, alter the course of events… 'modif[y] another entity in a trial'" (Bennett, 2010, p. viii). Lively things never stay still; they are always in the process of making and unmaking their association in their relational and dynamic networks.

A critical point here is that in this scholarship, realities are perceived as dependent, undefined, multiple and generative. Realities thus are negotiable, affected and changeable rather than out-there and immutable or unchangeable, according to some who advocate for a thinking with "matters of fact" or a realist approach (Chapter 3). They affect and are affected by every change in any single involved thing. Things (lively things or vibrant matter) are always involved in negotiable and experimental conversations. For knowing realities, we need not just acknowledge those things that are nonhuman or suppressed and marginalised but also seek both unpredicted and predictable associations and emergences from relational and dynamic networks of things. These co-operations, associations and emergences are things again, and belonging to processes of (un)making realities.

By perceiving realities according to this scholarship, we can always have possibilities to participate as other lively actants in these open conversations and to establish particular realties that are meaningful and appropriate, and in the process of becoming. In addition, "matters of concern" scholarship accounts for many involved actants, which means that the perspectives and values of these actants can also be credited in forming any realities. Formed by multiple perspectives, realities are thus also multiple and various.

[20] *Actants* are the sources of actions, as explained by (Latour, 2004a, 2005). These consist of human and non-human systems (Bennett, 2010).

The second point I want to mention in deploying “matters of concern” scholarship is to accept and learn to go forward under uncertain and unpredictable contexts. Latour writes: “The solution […] is to learn how to feed off uncertainties, instead of deciding in advance what the furniture of the world should look like” (Latour, 2005, p. 115). This is not about managing to foresee everything in advance before acting, particularly in the era of human-induced climate change. This means that, thinking with “matters of concern” provides us with open and multiple perspectives that come from varying actants. There will be multiple potential possibilities that enable us to deal with uncertainty and unpredictability. For example, Radhakrishnan et al. (2017) considered multiple perspectives in flood risk management in the province of Can Tho of Vietnam. They gathered different adaptation perspectives and acknowledge the impacts of multiple internal and external factors such as socioeconomic conditions, locations, flood magnitude, property ownership and so on. They then collated and established the links and compatibilities amongst these varying perspectives before determining particular adaptation pathways at specific locations and levels. They then conclude that by considering different perspectives, there is increased flexibility in implementing adaptation interventions in practice.

The following question can now be posed: should we move away from the focus on “matters of fact”, particularly in relation to facts of climate change, towards a new perspective of “matters of concern”? It seems to be very common that when we criticise things that are inappropriate or not what we want in our work as researchers, independent evaluators, government officials, NGO staff and others, we want to abandon or refute what we criticise. However, Latour argues that this “form of critical spirit has sent us down the wrong path” (Latour, 2004c, p. 231). He clearly states that we should not limit ourselves to paying attention to the construction of scientific facts of climate change, which at the moment are still at some level of uncertain (IPCC, 2012). In a recent interview, Latour comments on the effects of our reliance on a realist approach, which can serve as a “legitimate reason to block or postpone policy”, which might lead us to unwanted results for adaptation (de Vrieze, 2017). He suggests we need to respect “matters of fact” even though they are stubborn and are assumed to “speak for themselves”.

Puig de la Bellacasa (2017) adds to this argument for constructive thinking and adopting a realistic attitude:

> The purpose of exposing how things are assembled, constructed, is not to debunk and dismantle them, nor is it to undermine the reality of matters of fact … Instead, to exhibit the concerns that attach and hold together matters of fact is to enrich and affirm reality by contributing further articulations. (p.39)

Like Puig de la Bellacasa, Latour and his colleagues have repeatedly stressed that they do not refuse or dispute scientific facts or state that facts resulting from scientific studies are wrong. Rather they mention that there are multiple realities that are dynamic, elusive and generative and may be formed by many other actants that are not credited by familiar patterns of thinking with "matters of fact". More importantly, there is a need to interpret and acknowledge scientific facts, but not only those facts, for improving our knowing of what reality is.

So what does this mean for M&E of water-related CCAIs, in particular for local residents in Thai Binh province?

Thinking with "matters of concern", the idea of "democratic assembly" challenges the common will of many evaluators and practitioners that try to ensure manageable and controllable situations, especially under highly uncertain contexts of climate change. As discussed in Chapter 3, this often leads to assumptions and sometimes oversimplifications as to what is relevant or not, what is plausible and what is not. For example, current mainstream M&E practices following theories of change and results-based approaches only focus on logical and rational things. In contrast, with "democratic assembly" and "learning how to feed off uncertainties", evaluators, researchers and officials are encouraged to pay attention to involved things, including those that do not conform to scientific assumptions and sometimes are seen as irrelevant, invisible and implausible others. The M&E outcomes are thus formed inclusively and multiply by many involved things. Considering evaluands as lively things, indeed actants, evaluators also might be aware of the relational network to which evaluands and involved actants belong and the emerged associations they constitute. As a result, this may avoid the dissecting ethos or "bad habit of modern ethos" (Puig de la Bellacasa, 2017).

Thinking with "matters of concern" in the case of the World Bank project on Rural Water Supply and Sanitation, the outcomes of the project's M&E are definitely not just what is indicated in the official M&E reports. These M&E outcomes, indeed the local realities in relation to the effects of the World Bank project, should not be based only on results-based

approaches and systems of pre-determined indicators such as those shown in Figure 22. Indeed, the M&E outcomes should also take into consideration the ways practitioners collect and analyse data for official reports, local complaints about the inequality and unfairness of water bills between rural and urban areas, and complaints about broken water pipes. They could also include the uncertainty of groundwater quality due to wet and dry years, extreme climate events in Thai Binh province, the related concerns of lack of upkeep and inappropriate site selection for local water supply facilities, and the problematic political will that can claim that 100% of local residents are connected to piped running water pipe systems even if that is not enough. More importantly, these effects are also uncertain, unpredictable and dynamic.

This realistic approach considers evaluands as the gathering of involved lively actants. All things involved in M&E also belong to relational, dynamic and generative networks. The evaluators themselves are also gathered along with these actants within open and negotiable conversations. This means that there will be no split or elimination of affections, concerns and worries that practitioners may have within their processes of doing their M&E projects. In addition, realities are undefined and can be formed via our practices; the ultimate M&E outcomes thus are not about measuring and representing the effects as the realities out there but rather interpreting and establishing to form particular realities or effects of interventions within dynamic, changeable and ongoing processes.

So, what are particular guides or practices for deploying this realistic approach? To answer this question, the next section explores examples of how scholars have deployed “matters of concern” in their research. These examples open up a potential starting point for evaluators, researchers and government actors in Vietnam to shift from the scholarship of “matters of fact” to one of “matters of concern” in doing climate change adaptation and its M&E practices. This thus contributes to doing M&E differently, knowing local livelihood realities better and ultimately doing CCA better.

4.3. Examples of thinking with “matters of concern” for visualising alternatives

Thinking with “matters of concern” allows some scholars to see other realities that are more meaningful and to some extent transformative. Examples include the banana economy alternatives in the work of Hill (2015), alternative hygiene practices in the work of Dombroski (2016), slow food movements in the research of Hayes-Conroy (2010), and most noticeably

the Community Economies Research Network (CERN), developed from the work of JK Gibson-Graham and others. In what follows, I will detail how the two examples of the work of Ann Hill and Kelly Dombroski deploy thinking with “matters of concern” for the emergence of alternatives to their respective study areas of banana economies and hygiene practices. My arguments will be about how they consider their research objects and others involved as lively actants, gather and participate in open conversations with other actants, and then contribute to form alternatives or particular realities.

In the first example, Ann Hill thinks with “matters of concern” to assess banana economy initiatives, particularly in relation to Filipino farmers. These initiatives are a form of enterprise cooperation between local Filipino farmers and Japanese markets. Under these initiatives, the banana products are prearranged to be sent directly to the Japanese market. Japanese consumers are willing to pay a regular price to farmers, even in the circumstances of natural disaster resulting in damaged fruit. For their part, Filipino farmers promise a regular price even if they may be able to sell their product at a higher price on the open market elsewhere (for example in the Australian market during the banana crisis in 2011). These alternative food economy initiatives, based on meaningful exchange and trust, lead to guarantees for both Filipino growers and Japanese consumers. These initiatives are realities that exist and are maintained along with other traditional banana economies.

There are two opposing assessments of these initiatives. The first relies on thinking with “matters of fact”, which privileges capitalist criteria, logical outputs, dominant values, capitalist gains, large-scale initiatives and manufactured food. The initiatives could thus be assessed as promoting unfair trade, because of the cheap prices for local Filipino farmers against the high selling prices for Japanese customers. In contrast, an alternative assessment sees this initiative as an alternative, innovative and sustainable economic solution for uncertain contexts (Hill, 2015). This thinking considers long-term effects on small-scale farmers in the Philippines, the maintenance of reliable banana sources for Japanese consumers, and also the notion of sharing and support in the face of the uncertainty of the weather (storms and floods in the Philippines) and the global economy.

In interpreting these kinds of initiatives through her research, Hill (2015) took seriously a gathering of many involved lively actants. She carefully investigated and acknowledged the voices and contributions of these actants. For example, she considered the role of Del Monte,

a big-brand American food company that owns huge tracts of agricultural land in the Philippines. Del Monte also created local land conflicts as well as difficulties for small-scale producers and dependent farmers with low incomes, leading to a need for alternatives for these producers to maintain active farming production and better their lives. The actants can be the historical sugar crisis and impoverishment in particular areas that brought about direct contracts between poor Filipino farmers and Japanese markets. They also can be researchers, NGO commentators, local communities, conferences, NGOs, farmer groups and consumer networks involved in alternative food networks, including community-supported agriculture schemes and local food networks. They also can be floods, storms, the global economic crisis, and the specific preference of Japanese customers for the taste of Filipino bananas has led to the existence of fruit in the Japanese markets, even damaged one by storms in the Philippines.

The work of Dombroski (2016) examined hygiene practices for babies. In particular, the daily behaviours of mothers and women in rural/undeveloped and urban/developed areas were compared by participants according to two noticeable camps: “backward” and “modern”. For example, one practice uses washable cloth nappies and pants with an open crotch so that mothers and grandmothers can change the nappy easily or hold out babies to urinate. Through the lens of Westerners and modernisation, we might assess these kinds of pants and practices as “backward”, babies with bare bottoms as being a characteristic of undeveloped, unhygienic or poor conditions. However, in the OzNappyFree online group of parents in Australia and New Zealand, the practice of avoiding the use of nappies, even at night, was considered as an “alternative”, namely nappy-free practices. Apart from benefits to the environment with the reduced use of disposable nappies, this practice is also concerned with creating better conditions for the baby’s sensitive skin, acknowledging and opening up possibilities for multiple hygiene realities. These realities are to some extent already present and are different from conventional modern hygiene realities, such as the use of disposable nappies.

Dombroski (2016b) considered hygiene practices for infant babies as a gathering of lively things. There were many participants gathered to constitute the existence of successful hygiene practices in northwest China, Australia and New Zealand. “Participants” included cultural norms in China, the willingness of parents/caregivers in Australia and New Zealand to learn new hygiene practices, geographical conditions, the non-verbal communication of

babies, the attention of caregivers to the signals of urinating babies, amongst others. They belonged to relational, uncertain, dynamic and generative networks and constitute particular hygiene realities.

Thinking with “matters of concern”, both Hill (2015) and Dombroski (2016) treated these actants impartially. There was a “democratic assembly” of all participants in constituting banana economies and hygiene practices that does not prejudge according to already established outcomes. Both scholars did not dispute or debunk the realities of capitalist banana economies or modern hygiene practices; instead they mounted an experiment upon these realities. There was no special preference given to capitalist market transactions, waged labour, capitalist enterprises over local markets, smaller-scale growers, storms and floods, domestic and land conflicts, damaged fruit and so on, in the work of Hill (2015). The work of Dombroski (2016) has similarities. She made this perspective clearer in her “wordle” in Figure 23 that refines binaries by representing mothering practices in northwest China without putting them in dual comparison. She acknowledged all other hygiene practices that do not belong to conventional ones according to the knowledge from the West. There was clearly no privilege, separation, oppression or marginalisation for forming the realities of alternative banana economies and nappy-free practices.

Figure 23: Mothering practices in northwest China (Dombroski, 2016, p. 318)

More importantly, both Hill and Dombroski were not only interpreting and representing already existing realities but also opening up alternatives. By gathering and acknowledging multiple "participants" along with their voices, contributions and politics, Hill (2015) could launch her "critical inquiry" referring to "research methods and thinking practices that multiply possible ways of being and acting in the world" (p.551). Alternatively, Dombroski (2016) could "think multiplicity and see diversity" of hygiene realities that do not conform to one "right" "true" scientific modern reality; she even then contributed to enact the emergences and development of nappy-free practices. The outcomes of this sort of scholarship or intervention can be fragile and inconclusive because they are in experimental processes and "always in the processes of becoming" (Hill, 2015, p. 559). However, these inclusive and multiple outcomes clearly open up possibilities for sustainability and transformation, as in the two alternatives of banana economies and hygiene practices. In short, in thinking with "matters of concern", Hill (2015) and Dombroski (2016) visualise and even enact alternatives to banana economies and hygiene practices, respectively.

The question for me now is, how can I go further, or cross the boundary of thinking with "matters of fact", for more meaningful M&E outcomes. How can I deploy a realistic approach to describing and interpreting the effects of water-related CCAIs in constructive and inclusive ways? How can I take part in open and experimental conversations and activities that gather and assemble around the effects of water-related CCAIs in Thai Binh? And more importantly, how can I contribute via my research to "helping new ways of thinking and acting to materialize" (Hill, 2015, p. 552) particular realities, starting with doing M&E of water-related CCAIs at the grassroots level? The next section will focus on my journey as an example of an independent evaluator, governmental official and researcher who aims to achieve more meaningful outcomes from her M&E projects. Indeed, this is my personal effort to look beyond the familiar patterns or conventional M&E practice to know better what really happens or what water-related CCAIs really perform on the ground, which can ultimately contribute to my desire for more appropriate and sustainable climate change adaptation in the province of Thai Binh.

4.4. My scholarly move: The process of re-subjectification of the researcher

It is worth reminding readers about the limitations of the realist approach in doing our work, whether in CCAIs or their M&E practices. This approach gathers as much information

and evidence together as possible before proposing particular solutions, yet does not take into account the role it plays in affecting the information and evidence it purports to merely observe. And yet the realist approach still dominates, for example, current water-related CCAIs and their M&E practice, as mentioned in the preceding chapters and in the Vietnamese PhD studies mentioned in the introduction. Indeed, to move away from this realist approach is difficult: the process involved in embarking on this kind of epistemological change, as stated in introduction, is fraught with painful experiences.

In this section, I thus aim to expose my own process of going from thinking with "matters of fact" to "matters of concern" for doing M&E of water-related CCAIs differently in the province of Thai Binh. I lay out my process of re-subjectification to become capable of thinking with "matters of concern" or following a realistic approach. On one hand, this can be understood as a journey of new social scientist who experiments with different research methodologies in her own project. On the other, it is a process whereby she becomes more responsive and adaptive in doing research on CCAIs under conditions that are uncertain and unpredictable. It is important and necessary for better climate change adaptation, and indeed for transformation and sustainability, since it is not only about proposing and implementing adaptation interventions but also about becoming adaptive and responsive in doing our work.

Moving forwards from the breakdown

I first return to the root causes of my painful experiences in experimenting with the SLA for knowing and representing local livelihood realities (see Chapter 2). In particular, following the postdevelopment perspective, I applied the SLA with the idea of tracing livelihood trajectories for knowing the *messy realities* left by developmentalist water-related CCAIs. Within this first experiment in my thesis journey, I duly developed a set of indicators as per my belief in the usefulness and legitimacy of indicatorism in measuring and representing local livelihood changes (or realities) due to water-related CCAIs. I was eager to develop a set of indicators even though I was aware of the complexity, uncertainty and unpredictability of climate change impacts and relevant interventions.

From the rich descriptions of local livelihood realities in relation to water-related CCAIs indicated in Chapter 2, time spent farming, for example, seemed like an obvious major livelihood outcome for local residents of improvements in irrigation infrastructure. Changes in

farming time can indicate better or worse water control for farmers. To boost its legitimacy as an indicator, farming time was also tested via some criteria for good indicators, such as SMART (Specific, Measurable, Attainable, Relevant and Time-bound) and CREAM (Clear, Relevant, Economic, Adequate and Monitorable) (Christiansen et al., 2016), and seemingly met these basic criteria. This means that time spent farming can potentially be a good indicator for measuring and representing local realities in relation to water-related CCAIs.

However, using an anthropologist lens that is similar to what Latour and Woolgar (1979) applied at the Salk laboratory, I followed exactly how scientists make scientific facts for the emergence of the "time spent farming" indicator. After applying all kinds of research methods and activities (see section 2.3) and relevant apparatus and materials (e.g., NVivo software, cameras, voice recorders, literature, posters, oral presentations, computers), I managed to get the indicator of farming time to become (or at least look) unquestionable, defined and concrete. Yet I also came to understand the pitfalls of current M&E practices, especially the use of indicators for representing changes in relation to particular interventions.

In particular, my reading and my experiences in the field helped me understand that the indicator of farming time to some extent *could not* represent local livelihood realities and the fluctuating decision-making processes that local farmers use to inform their adaptations. There are many influencing factors, actors and indeed actants in relation to farming activities. The indicator of farming time does not reveal the reasons why even with the support of the same infrastructure programmes, locals in Nam Hung do not apply time-saving direct seeding practices as they do Quoc Tuan, where direct seeding is in common. This is not because of differences in implementation of these infrastructure programmes but rather because of other actants in Nam Hung, such as its geographical conditions, particularly its coastal location, which has a higher risk of saltwater intrusion and water scarcity in late January, when the *Vụ Xuân* crop is due for planting.

The processes and practices of using farming time as an indicator to measure the success of climate adaptation infrastructure programs can also work to undermine, amplify and establish other realities in relation to farming production. In particular, the indicator of farming time and its effects, such as more time to pursue other income sources and less toil, have been acknowledged officially and widely in Quoc Tuan. As such, reducing farming time becomes a political target of local administrative systems for its own sake. The local irrigation

system and cultivation plans are primarily set up to support direct seeding. Local officials assume that new irrigation facilities and better water management can ensure the best conditions for germinated rice seeds and young plants. Local farmers are now required to follow a strict schedule for their household farming activities, otherwise they are faced with a late crop, leading to many unfortunate consequences, as mentioned in Chapter 2. With around 98% of local farmers following this practice in Quoc Tuan (People's Committee of Quoc Tuan Commune, 2016), the reality of new farming practices, particularly direct seeding, become "realer". Chapter 2, however, pointed out the potential risk of this practice for local farmers—that is, the high risk of cold weather affecting young rice plants and causing a lower yield, as happened to the *Vụ Xuân* crop in 2016.

Therefore, while farming time can show us changes that have happened due to the water-related infrastructure programme, these changes are just a partial representation of local farming realities. Applying this indicator can also be seen as a favouring of reduced farming time and labour over the potential risk to young rice plants of harsh weather conditions. This indicator amplifies the effects of the water-related infrastructure according to governmental assumptions and objectives. These assumptions are narrow and bounded, while the actants in relation to local farming realities are multiple, relational, dynamic and uncertain. This indicator cannot represent the processes and reasons why Nam Hung farmers are not interested in direct seeding practices even though it may save them labour and farming time. In other words, the local realities are not measured and represented by this indicator. This indicator thus was in disharmony with the local realities and the effects of infrastructure programmes, even marginalising and blurring them.

All in all, my efforts to develop indicators for better M&E of water-related CCAIs did not seem worthwhile as they did not provide any potential possibilities for doing M&E differently towards more meaningful and significant climate change adaptation in the province of Thai Binh. This was the point of my breakdown in practice within my own PhD project.

Start from where you are

Building on this critical moment, I tried to make a shift away from thinking with "matters of fact", an approach that was obscuring me from seeing realities on the ground. However, the allure of the utopia of science and technology, as described earlier in the thesis, was still

strong. Escaping my fascination with solid scientific facts was definitely *not* going to be an overnight mission. This is because thinking differently is “hard work: thought is often pulled back in line with bad old habits, and often, ‘we ourselves stand in the way’” (Gibson-Graham, 2006, cited in McKinnon, 2017, p. 346). It was hard and it took time, yes, but at least I knew that I had to face this disharmony or breakdown, and more importantly, I needed to accept and fully experience this breakdown.

What is positive, however, is that “breakdown” is a crucial starting point for new conversations and connections that open one up to other realities. Escobar (2018) clearly states that “a breakdown is not something negative but *provides the space of possibility for action*—for creating domains where *new conversations* and *connections* can take place” (emphases added, p.115). I therefore started from where I left off.

I began by focusing on answering the question: Were there any other actants at play in the emergence of my breakdown, apart from the analytical and comprehensive SLA with relevant research methods and apparatus? It turned out that there were other actants involved in the processes and practices that I used for developing indicators—but they had been eliminated and left unacknowledged for the sake of making *good* indicators. For example, local responses to me were affected by my personal position as a government official, PhD student from an overseas university and urban dweller.[21] They more or less seem to respond according to what they assumed I wanted to know rather than what is actually happening in their daily lives.[22] In addition, my traits and personal viewpoints as a researcher, official, and independent evaluator—indeed a scientist—also affected my own practices and assembled particular constructions or realities.

To take advantage of a moment of breakdown for *new conversations* and *connections,* Escobar (2018) also alerts us to the requirement of “intense engagement and involved

[21] I was aware of this issue before my field trip, and so when I went to my hometown, I made sure to wear clothing that made me look not too different from my participants. However, in rural community with strong connections of kinship and neighbourhood, you are who you are—an outsider. Moreover, as per the requirement of the ethics committee of the University of Canterbury, I had to go through the entire introduction of my project, including my positionality, with each participant.

[22] It was very common for local farmers to state that they worried or at least felt uncomfortable with the idea that local officials might have access to what they told me. They wanted to avoid any obstacles to any “help” coming from local officials. They common view is that officials not only do their jobs in governmental administration but also think of themselves as helpers for the local residents. If the officials do not like them for some reason, local residents risk encountering trouble in their future administrative requirements. This worry was manifested even though I assured them of confidentiality.

experimentation". Intensive engagement and involved experimentation are different from a comprehensive, rational and objective approach such as applying the SLA in a conventional manner as I did for knowing local livelihood realities (see Chapter 2). We need to *close the distance* between us and that with which we want to have new conversations and connections, indeed what we study. In my case, there was a need for *closing the distance* to local livelihood realities. In my post-breakdown mode, I chose to immerse myself in site contexts via homestays with local residents. I soaked my body in local residents' daily activities and surrounding environment including water, soil, people, culture and other entities. I became less of an official and outsider and more of a learner and a relative.

My starting point for new conversations and connections was the combination of my understanding of local realities under water-related CCAIs due to the comprehensive and analytical SLA and my own personal memory of rural lives and agricultural practices even though I did not understand them well.[23] I took inspiration from Gibson-Graham (2006), who drew on Zen master Shunryu Suzuki:

> [I]n the beginner's mind there are many possibilities, in the expert's mind there are few" (1970, 1). The practice of doing weak theory requires acting as a beginner, refusing to know too much, allowing success to inspire and failure to educate, refusing to extend diagnoses too widely or deeply. (p.8)

My breakdown and lack of farming knowledge, it turns out, helped me to learn I could refuse to know too much through my bounded rationality and the comprehensive and objective SLA. I have learnt "valuing of the things that people do in the places where they are, without relying upon an overarching framework to introduce, validate or extend such localised 'doings'" (Ireland & McKinnon, 2013, p. 2). This also conjured up my embodied experiences as a citizen of Thai Binh and a daughter-in-law of a farming family for more than 10 years now. My second field trip was therefore not only for the two case studies but also an exploration of my own memories and my personal life-sharing with my farmer relatives and in-laws in a rural area.

[23] I was born in an urban area of the largely agricultural province of Thai Binh. My parents worked in hospitals as a doctor and nurse. Although they were both from farming backgrounds, I was brought up with the belief that science and technology is a panacea for "development", not for my own personal life but also for society. I had experience with rural lives and farming practices through short visits to my father's hometown for occasional events such as the Lunar New Year, Autumn Festival, etc., but my understanding of farming practices in Thai Binh was still inadequate.

My participants are not only the people I encountered at the sites but also my relatives in Thai Binh, and even my own body.

My research practices and activities have thus become an experience of intense engagement and involved experimentation, even with my own body. Wright (2017) calls this a "mucking in" stance to doing research. This stance is about being willing to accept risky engagement with fields, as Wright herself did in "not [being] afraid of putting her hands in the dung" (p.338) in her compost research in the Philippines. This "does not come from an experience of order or already-known beauty, but from appreciating diverse ways of knowing and being, a receptivity towards surprise(s) (even terrible ones), and an awareness that everything doesn't have to mean the same thing!'" (p.339).

I, thus, found myself mucking in. For one, I did not hesitate to wash my face and body with yellow, sticky, smelly water available in the two study communities in the dry season. This water is used for most domestic activities except for drinking in those households who cannot afford piped running water. It is common for most local residents there. Frankly, it was not a nice feeling after showering in this kind of water. I did not feel any freshness or cleanliness as my skin was seemingly covered by an invisible slime. However, it was quite a "surprise" to experience the freshness and sweetness of rain water, which is different from chlorinated piped running water in urban areas in Thai Binh or Ha Noi, where I had lived for most of my life. I was honestly reluctant to use latrine toilets, but I also relished the satisfaction of the nice smell and tastiness of fresh rice at the celebration of the first bowl of rice after every crop *(Lễ cúng cơm lúa mới)*[24] with my host family in Quoc Tuan.

My body and mind have been intertwined or "mucked in" with not only the physical non-human entities of the fields, for example, water, soil, foods, rice plants or latrine toilets. I also connected with local residents' emotions, concerns, cultures and social statuses. It became obvious to me that my concerns, for example about the impact of the water's quality on my skin and health, and local residents' concerns are clearer and more noticeable than

[24] *Lễ cúng cơm lúa mới* is a ritual for the first and fresh bowl of rice, celebrated at the household level after every rice crop. In the past, this celebration was quite dignified and important for many local farmers (Nguyen Khac Xuong, 2011). There are currently not many households following this ritual as for many rice production is no longer the main source of income. However, my host family in Quoc Tuan are both farmers and fishermen and therefore care seriously about their ritual practices. They celebrate *Lễ cúng cơm lúa mới* in a very dignified way.

ever before. I was opened up to new conversations and connections by mucking in with my body and mind in local contexts.

Interestingly, there are two ways our bodies engage with new worlds just after a connecting moment (Latour, 2004a). The first way is through our physiological body. For example, my nostril receptors react to chemicals dissolved in the local groundwater (e.g., manganese, magnesium, calcium, iron). The second is through subjective embodiment, for example, the way I perceived groundwater apart from its chemical content. Latour (2004a) calls this subjective embodiment "lived-in expression", for example my embodied reactions, thoughts and concerns about the sliminess and smell of groundwater and the potential impact on my health. The sensory/somatic and subjective embodiments come together and are inseparable.

Thus my taste buds and my body reflect the chemicals in the water and material representations of fresh rice such as softness, tastiness and freshness, but they also appreciate host-family customs such as their respect for ancestors, beliefs and faith in the "supernatural", gratefulness to all non-human entities involved in their rice crop, satisfaction after a successful crop, or family solidarity. Pietrykowski (2004) argues that "the experience of taste is embedded within a social and cultural milieu involving habits, norms, rituals, and taboos" (p.312). My argument here is that new sensitive worlds/realities have been opened to me via my taste buds, my nostril receptors, my skin cells, my bare eyes, and other physiological mechanisms. Longhurst, Johnston, and Ho (2009) state that these experiences of senses provide an essential foundation for our wider understanding in terms of social and spatial relations. These embodiments disclose other realities or the effects of water-related CCAIs in relation to the local livelihoods that are more complex and messier than the realities coming from the literature review I conducted before taking the second field trip.

With my embodied connection with local entities, I became part of the entanglement with local groundwater and with local contexts including the activities of members of my host family, the surrounding environment, and so on. More importantly, these local entities, both human and non-humans, have effects on us. The feeling of sliminess on my skin, for example, is not determined by my body, my mind or my consciousness but rather by the nature of particular household shallow wells, the weather conditions, the intensity of my host family's daily activities, their plans for me in exploring their neighbourhood and relatives' places where

we might have to walk or travel for a while. This thinking and perception of things is similar to what Bennett (2010) emphasises in her book *Vibrant Matter: A Political Ecology of Things*, where in an epigraph she cites famous Dutch philosopher Baruch Spinoza: “It is never we who affirm or deny something of a thing [e.g. slimy, stinky, salty water]; it is the thing itself that affirms or denies something of itself in us.” More importantly, these entities are all involved participants or actants gathered to make this sliminess exist and maintain its existence on my skin. They have their own voices and their own politics for building their dynamic associations and being affected by and affecting others.

This sliminess is also one of the local realities that are somewhat formed by a “thicket of connections between vague yet forceful and affecting elements” (Stewart, 2008, p. 72). These elements are vague—yes! they really are—but they can affect others. The sliminess of groundwater might be elusive, uncertain and ever-changing, just like the weather conditions and my host’s plans and ideas for introducing me to their relatives and friends. However, they are noticeable by my body and mind, and I could not ignore that. The sliminess is present on my skin. The stinky and slimy water follows me all day long while I am at site areas. The sliminess forces and demands my notice and responsiveness. In other words, bodily experiencing the effects of water-related CCAIs on the ground has *other* effects. These *other* effects reminded me of the rural lives of my relatives, and made vivid my father’s stories and my mother-in-law’s complaints about the toil of farming or their other embodied experiences and knowledges. They also gradually become housed in my body, my mind and my [sub]consciousness, which guides me to different realities that I have never taken notice of before.

It is clear by now that I, a classic scientist and independent evaluator, have apprehended a realistic attitude or thinking with “matters of concern”, like other scholars including Ann Hill and Kelly Dombroski. Via my embodied experiences, I was able to consider the effects of water-related CCAIs on local livelihoods as lively *things* gathered by many participants or actants. They are not only affected by my presence and activities but also have affected me. I have become more responsive to other actants within their dynamic, generative and relational network. Similar to “critical inquiry” (Hill, 2015) or “think multiplicity and see diversity” (Dombroski, 2016), my embodied engagement and experiences have guided me to the diversity and multiplicity of local realities. These local realities consist of not just what was

indicated via a rational and analytical framework, as discussed in see Chapter 2, but also of other effects formed by the gathering of sliminess, stickiness, tastiness of fresh rice, local cultures, personal joys, local rituals and so on. From my scholarly move or re-subjectification, I have been able to know better local livelihood realities. Chambers (2017) argues this move as being for “new constellations of being wrong and new ways of being right, of being in touch, up to date, and realistic” (p.xiv). In other words, I have been “open to challenge”. In this way, I have learnt how to know better.

The question now is that, what better doing can result from this realistic research approach that has offered me better knowing of local livelihood realities via my own embodiment? Yet it is not possible to monitor and evaluate all projects and interventions through personal embodied experiences. I also have not been able to contribute, enact or shape any kind of alternative livelihood for Quoc Tuan and Nam Hung from my own PhD project. However, my better knowing of local realities via my embodied experiences and engagement provokes the idea of application of embodiment for doing M&E. My contention for the next section is to explore whether embodiment or an embodied approach can support us in doing better M&E, indeed in knowing what CCAIs really enact on the ground and what effects matter for locals.

4.5. Crafting an alternative to monitoring and evaluation practice: Embodied methodology

This section explores an alternative approach to knowing about the effects of CCAIs, based on paying attention to the embodiment of not only researchers or evaluators but also of research participants. This embodied approach is totally different to what I have attempted in exploring local livelihood realities through the SLA in Chapter 2. Considered as an alternative for knowing other local livelihood realities, this approach is expected to support researchers and evaluators in doing their research and M&E projects differently (I will return to how we can do this in Chapter 6). Embodied methodology is also considered as the second methodological approach for the thesis. It will be experimented with in the next chapter for knowing other local livelihood realities.

Embodiment is always present in our work, whether doing M&E or our research. However, applying embodiment as a research method has still not really received proper

recognition, even in qualitative research such as the M&E currently done via qualitative analysis (Longhurst, Ho, & Johnston, 2008). Hayes-Conroy (2017) bluntly states that our research methods, particularly qualitative methods, are always embodied. Similarly, Wilbur and Gibbs (2018) argue that qualitative research always relates to some corporeal activities. Although there are always social and political constructions in the processes of making M&E outcomes, these are often abstracted or repressed in order to create legitimacy and professionalism (see Chapter 3).

Using the body as a tool for doing M&E is thus an alternative. This is totally different to adopting a disengaged or objective attitude in doing M&E for our research, discussed in Chapter 3. While current M&E practice denies and erases the human influence (Dahler-Larsen, 2006; Whitehouse, 2005; Winderl, 2005), my alternative approach deliberately uses human-embodied interpretation to explore realities. To know and interpret realities better, Schwandt (2002, 2003, 2008, 2017, 2018) thus asks evaluators to let their subjects and what matters (either for them or their evaluands) back into the M&E processes, applying this kind of embodied approach.

My own embodied experiences and engagement are the starting points, and my body is the platform to gather involved actants that form local livelihood realities. There is also no difference between the actants recognised by my own body and the rational and analytical description mentioned in Chapter 2. My personal embodied experiences and engagement make plain the other local realities affecting livelihoods, such as the sliminess and smell of groundwater in the dry season. These realities matter for locals, and yet they are not recognised in any official reports or by the wider public.

In particular, I have used my body as a research instrument that supports me to explore local livelihood realities. I spent six weeks living in a homestay with locals in two case-study communities from 29th October 2017 to 13th December 2017. On this second field trip, I did not elicit information from locals via SLA-informed questions; rather I communicated, learnt and experienced with local realities via my body. This was my full-bodied instrument, including my taste buds, my skin cells, my memories, my cultural beliefs and values, and my life-time with in-laws and relatives in rural areas. I also made sense of these realities via locals' descriptions of their embodied experiences and engagement with other non-human entities or actants. My conversations and communications with the locals gathered also around questions such as,

“What did that feel like?”, “What were you thinking/feeling at that time? “What were your emotions at that time?” and “How did you bodily know/notice that?” My conversations and communications with locals can be termed “sensory interviewing”. These conversations were sometimes recorded with their consent and sometimes recalled from my field trip notes.

Due to time constraints and other limits, I based myself only on what locals *talked about* in terms of their thinking, feelings, thoughts, concerns and other emotions in relation to specific phenomena such as floods, pest epidemics, plant diseases, water, rice plants and soil. For sure, in applying an embodied approach, there are many methods possible, such as using photos and sound/video recordings to encourage participants to recall their feelings, emotions and embodied experiences in terms of particular phenomena, which supports more detail on sensual descriptions (Chadwick, 2017). I focused on living with locals and experiencing some of these phenomena and things via my own body, feelings and thinking. My embodied experiences and intertwining with locals and involved actants represent a kind of embodied reflexivity that is most predominant within embodied applied research methods.

Below are some of my notes during and after this second trip.[25]

> My field trips for this research are not only case studies, but also my own memories from my childhood and the explanations from my relatives. My body and mind have been intertwined with not only the physical non-human entities of the fields, it also connects with the emotions, concerns and the current social status of the local residents. My own embodied knowledge opened up for me a new understanding of how change due to climate change adaptation interventions can be differentiated at embodied levels. I differentiated the storm water, shallow ground water and piped running water through my taste buds, showering my body, and washing my clothes. I noticed the freshness, sweetness, and satisfaction that came from storm water, as well as the saltiness, stickiness and sliminess of the shallow ground water in dry seasons. The combination of my embodied knowledge and that of the participants I interacted with reveal the complexity and messiness of the impacts of climate change adaptation interventions on the local communities.

Taking into account my positionality and other sentiments, I not only got locals to talk, as I listened, about their embodied experiences in relation to water-related CCAIs but also to some extent described and interpreted their experiences with my body. This required a higher

[25] This note also appears on the paper that I co-authored, “The Affect of Effect: Affirmative Political Ecologies in Monitoring Climate Change Adaptation Interventions” (Dombroski & Do, 2019).

level of attention, understanding and knowing of local livelihood realities. My homestay time and concurrent bodily engagement with local communities, including human and non-human, clearly indicated my full commitment to and effort for knowing better local livelihood realities, ultimately with the purpose of contributing to doing better CCAIs. Chambers (2017) has a good word for describing such an embodied approach via homestay time with local communities: he calls it ground-truthing. This ground-truthing can bring "rigorous, open-ended, up-to-date insights into the realities of those who are last [i.e. the oppressed, ignored, irrelevant, non-scientific, marginalised, etc.]" (p.156).

I am not the only person applying this embodied approach. For example, in the work of Wilbur and Gibbs (2018), Wilbur's body and those of participants were deployed as research instruments to explore food politics in Italy. This research pointed out the role of, for instance, sensory pleasure on the economic value of herbs or the sensory feeling and physical labour involved in chicken slaughtering that affects farmers' behaviours in their treatment of animals and their slaughtering techniques. This understanding supported further debate and solutions in terms of the local market and animal welfare in Italy. Exploring the embodiment of research participants and their own embodiment as researchers, Longhurst et al. (2009) joined with their participants in cooking sessions and carry out sensory interviewing around foods that were significant for them, their feelings and emotions. They manifested how these migrant women viscerally connect with their old homes from their new homes in Hamilton, New Zealand. Based on these new knowledges, social policies and other interventions could bring things that matter for them, for instance, the improvement of social networks, housekeeping or child-rearing.

By understanding bodies as multiple, open and messy within relational networks, some feminist geographers also mention the body as a research instrument for exploring and interpreting complex, dynamic, uncertain and multiple realities in relation to their research. Based on the work of feminist philosopher Annemarie Mol on the concept of the body multiple (Mol, 2002), Dombroski (2012), for example, argued that there are multiple realities or understandings of maternities that can be simultaneously presented within a body, for example her own body, in different locations and conditions. Alternatively, Wilbur and Gibbs (2018) state that knowledge from an embodiment approach is inclusive and formed by the acknowledgement of research participants' bodies. Considering the multiple perspectives and

values of research participants, including human and non-human, will thus support researchers in seeing multiplicity.

The body, as Longhurst (2001), a feminist scholar, argues, has fluid boundaries with the relational networks in which the body takes part. Based on her work on pregnant and heterosexual bodies, she states that "[b]odies are also always in a state of becoming with places" (p.5); they are open and never "self-contained", and "can only exist in a complex relational nexus with other bodies/spaces" (p.129). Alternatively, Obrador-Pons (2007) mentioned how human bodies, with their negotiations and conversations both internally (with their sensuality and enchantment) and externally (with other entities such as the sand, seawater, wind, and sunlight), literally formed the nudist beach in Menorca, Spain. My contention here is that human bodies are always in negotiation and conversation with their surrounding environment and other related entities, which in turn forms particular phenomena. This offers possibilities for us in getting to know and understand the surrounding environment and other related entities within their relational, dynamic and generative hybrid human and non-human networks via the interpretation of the body.

The embodied approach also considers the capability of our bodies, where through its experimental conversations with others, it forms social change or social transformation. In Cameron et al. (2011), the bodies of the coordinators (Cameron and her colleagues), urban gardeners, researchers and others have been deployed via their bus trips to different urban community gardens in Newcastle, Australia, which ultimately sparked transformative solutions in dealing with climate change risks. Their bodily engagement and experience with involved actants such as community gardens, local residents, bees, vegetables, soils, irrigation systems, fences, and so on have led to the emergence of appropriate garden adaptation techniques to face climate change, such as using various plants for pest control, using different irrigation systems and planting legumes to improve soil fertility.

More importantly, via embodied methods, researchers not only reveal already- existing realities and knowledge but also contribute, stimulate or enact their participants to produce new, useful knowledge that is situated, adaptive and specific. For example, in Dombroski (2011), mentioned earlier, her embodied engagement and presence as a foreign mother with her daughter acted with lay-mother-researchers in producing their useful knowledge. This knowledge is a combination of Chinese traditional and Western knowledge, commenting on

Dombroski and other foreigner mothers' practices. By the same token, via embodied methods, Longhurst et al. (2009) did not only contribute to reveal already-existing knowledge of migrant women's lives: their cooking sessions and participants' activities also contributed to crafting new useful knowledge for these migrant women, for example, in sharing and establishing knowledge about good markets and shops for traditional ingredients.

With this approach, along with eliciting empirical data for our research, we simultaneously create a platform or space for open and experimental conversations and negotiations whereby researchers and participants (including both humans and non-humans) work collectively and collaboratively to inform particular emergences of realities. This is also a very natural way of getting researchers involved in the realistic mindset—that is, thinking with "matters of concern", as discussed in the previous section. From these kinds of conversations and negotiations, we can intentionally work with other actants gathering around particular shared concerns related to our research objects, and then form particular realities that are what we want to bring into being as ultimate research outcomes.

In addition, the embodied approach helps us think about performativity. An embodied approach pays attention to emotion, affect (in the sense of psychological effects felt in the body), cultures, concerns, beliefs and so on of both researchers and research participants. Similar to my personal changes in behaviours and research activities after my embodied engagement and experience with the sites, these kinds of sentiments always have effects on both researchers and lay participants. Therefore, paying attention to the body in qualitative research will potentially encourage both researchers and participants to enact further changes in their behaviour. Some scholars, such as Gibson-Graham, Cameron, Healy, and McNeill (2019), Cameron et al. (2011), Roelvink (2016) and others, would call these kinds of further behaviours or adaptations the *performative effects* of our research.

Put simply, an embodied approach does not only reveal the already-existing reality or offer a closer understanding of "what really happens" as a substitute realist approach or realist evaluation (see Chapter 3). Rather it actually also manifests as an increase of possibilities for further actions. I have just given some of potential applications of an embodied approach. I will return to this matter in Chapter 6, to detail how an embodied approach might contribute to my pursuit of the ultimate objective of this thesis—that of doing something differently for M&E of CCAIs, then doing climate change adaptation differently for sustainability and

transformation. An embodied approach is thus appropriate for exploring local livelihood realities, indeed knowing better what happens and what matters for locals in relation to water-related CCAIs at the grassroots level in the province of Thai Binh.

4.6. Conclusion

This chapter has harnessed the concept of “matters of concern” developed by Bruno Latour for a realistic attitude. While thinking with “matters of fact” focuses on accurately and legitimately measuring effects against whatever objectives or assumption, thinking with “matters of concern” focuses on exploring and interpreting meaningfully the effects with relevant attachments, and more importantly, joining in the gathering of and conversations with involved actants for form particular realities.

In particular, I have examined two main points of “matters of concern” scholarship for a realistic research approach. The first point emphasises the liveliness of involved things, or indeed actants. Actants, the source of actions, have their politics within their relational, dynamic and generative networks, and always in the process of negotiation and conversations to form reality. This leads to the perceptions of realities always multiple and in the process of becoming, thereby we can literally find our possibilities to join in to form particular realities that we want from our work. The second point is that with multiple and collective efforts from varying involved actants, we are capable of learning by doing forwards appropriate adaptation in uncertain and unpredictable circumstances.

This chapter has teased out how “matters of concern” support M&E practices for overcoming the common pitfalls mentioned in Chapter 3. “Matters of concern” consider evaluands as gatherings of involved lively things. They all belong to relational, dynamic and generative networks and are considered non-dual. There is no split, marginalisation or privilege for particular actants. There is also no discrediting or refusing of any results constructed by solid and concrete materials and scientific M&E practices. The important point here is that there is no longer any overassumption and oversimplification in uncertain contexts. With “matters of concern” there is no detachment of evaluands from of their forming contexts, which are relational, dynamic, collective and generative. This also means that evaluators’ subjectivities are implicated in an M&E project, and we should pay close attention to what this

enables. What matters for both lively things and evaluators/researchers is that the processes of forming reality are taken into account.

To make this realistic attitude more accessible for evaluators, researchers, officials or whosoever, this chapter has exemplified scholars who have successfully deployed it in their projects. Thinking with "matters of concern", Hill (2015) and Dombroski (2016), for example, gathered themselves and all involved actants around particular concerns. Considering banana economies and hygiene practices as lively things, they were invited into open conversations and collective efforts with other actants, then contributed and enacted sustainable realities (perhaps transformations), particularly alternative banana economies and nappy-free practices.

Similar to the two epigraphs for this chapter, I candidly narrated my breakdown in practice in attempting to develop a set of robust indicators for *really* representing local livelihoods. However, this breakdown turned out to be the starting point for me to move from a scholarship of "matters of fact" to one of "matters of concern". This breakdown encouraged me to explore local realities from a "mucking in" research stance, which emphasises embodied engagement and experiences with the sites. Making sense of local livelihoods via my own body. All involved so-called inert objects were somehow shifted into being lively things or actants. I was then affected by them within their dynamic, generative and relational network. Similar to the "critical inquiry" of Hill (2015) or "thinking multiplicity and seeing diversity" of Dombroski (2016), my embodied engagement and experiences have guided me to the diversity and multiplicity of local realities. These local livelihood realities are not just those uncovered via the comprehensive and analytical SLA in Chapter 2 but also other effects formed by the gathering of sliminess, stickiness, tastiness of fresh rice, local cultures, personal joys, local rituals and so on. The kinds of effects formed by bodily experiences and engagement are inseparable from local livelihood realities, more importantly they matter for locals and drive them to form their daily behaviours.

These effects, however, are not recognised in official reports or by the wider public, which leads to a need to better know and acknowledge them. There is also a need for acknowledging these effects at the higher level than just one individual's embodied experiences and engagement. I have thus theoretically tested the embodied approach as the second wave of methodological approach for the thesis. I have argued that applying an

embodied approach in exploring local livelihood changes due to CCAIs at the local level would be appropriate. The embodied approach is a potential alternative for doing M&E differently. Local embodiment will not only reveal how and what locals do for their living but also manifest their reasonings, politics, emotions, affects and other sentiments and feelings that constitute the formation of any livelihood phenomena. By proposing to integrate an embodied approach into doing M&E, this chapter has visualised a particular potential possibility for doing M&E differently. This alternative to M&E expects to overcome the common pitfalls and limits of current mainstream M&E (discussed in Chapter 3).

Chapter 5 will test an embodied approach for knowing local livelihood realities. It will examine local embodied experiences and engagement with others in doing their farming activities. In doing so, Chapter 5 will forge and move along this possibility or alternative towards practical application. The interpretation of local livelihood realities in relation to water-related CCAIs will constitute another knowing that includes the attachments of what they mean for locals, researchers and other involved actants in the context of the province of Thai Binh.

CHAPTER 5

EXPERIMENTING WITH AN EMBODIED APPROACH FOR KNOWING LOCAL LIVELIHOOD REALITIES

Uống nước nhớ nguồn, Ăn quả nhớ kẻ trồng cây

When we drink from a river, let us not forget whence it springs.

When we eat fruit from a tree, let us remember the one who planted it.

Cày đồng đang buổi ban trưa
Mồ hôi thánh thót như mưa ruộng cày
Ai ơi bưng bát cơm đầy
Dẻo thơm một hạt đắng cay muôn phần

Ploughing at noon,

Sweat is pouring down.

When we enjoy a full rice bowl, please remember,

For one grain of fragrant and soft rice, there is much toil and bitterness.

(Vietnamese proverbs)

5.1. Introduction

Current CCAIs in Vietnam, and water-related CCAIs in Thai Binh, are top-down, technocratic, development-as-usual models prioritising hard construction, calculation and control. The previous chapters have examined both their beneficial and maladaptive aspects. Their benefits include reduced labour, more modern irrigation facilities, agro-machinery services, high crop yields and more income sources. Maladaptive effects include water scarcity, salt-water intrusion and water that is less silty, which leads to more farming time, smaller harvest, the increased use of agro-chemicals, and higher agricultural costs.

The description of these effects and local livelihood realities has not revealed anything particularly new. Even when local livelihood realities are revealed in various reports and publications, it does not mean that outsiders can understand these effects as they are understood by locals. More importantly, these effects have "affected" locals, that is, brought local people into an emotional and embodied response (Roelvink & Zolkos, 2011); indeed too often this "affective response" materialises different realities for locals, resulting in particular effects related to our body – which I have called "affect" (following Pile (2010), Gregg and Seigworth (2010), Massumi (2002) and other human geographers studying affect) or, to make it somewhat clearer for myself, "affective effects". Affect or affective effects, in turn influence locals' responsiveness and their appropriate place-based and ongoing behaviours. Through the body, locals' "make sense" of their surrounding environment, other entities and livelihoods in relation to the effects (Guba & Lincoln, 1989, p. 8), affective effects, responsiveness and behaviours are "constructions" and "realities" formed via "interactive processes", . There is thus a need for being interpreted within M&E outcomes.

The preceding chapter proposed embodied knowing as a research method, which I have named as an alternative to M&E practice for knowing the effects of water-related CCAIs. Bodily experiences and engagement are considered a starting point and platform where all of the involved actants gather and assemble around particular shared concerns. Local embodied experiences take into account locals as well as non-human entities, indeed actants, such as land, soil, water, local customs, culture, spirits and religious beliefs. This chapter, thus aims at applying embodied means of knowing local livelihood realities in relation to water-related CCAIs for my two case-study communities in Thai Binh. This chapter offers another

description of local livelihood realities. This description consists of not only the *facts* as described in Chapter 2 but also the emotional, embodied and affects that matter for locals, which can be understood as the meaningful understanding of local livelihood realities. With this meaning-laden, situated and specific knowing, we can bring already-existing appropriate adaptations made by locals to the fore. We can also learn from locals in dealing with uncertainty and unpredictability. In addition, by experimenting with an alternative to M&E, this chapter pays attention to potential possibilities or blazes a trail for doing M&E differently.

5.2. Embodiment, mutual communications and relationships

In order to model how embodied methods can be helpful in interpreting local livelihood realities, this section aims to demonstrate how locals participate in conversations with other involved actants gathered around their shared concerns, and the purposes these conversations serve.

Ways of communication

Local farmers have gone about their daily farming activities through embodied experiences with the surrounding environment and other entities. Although farming activities are now less manual than in the past because of irrigation infrastructure and the agricultural machinery services mentioned in Chapter 2, manual farming activities remain primary, for example, preparing and cleaning up the land, sowing, transplanting seedlings, weeding, catching *Ốc bươu vàng*/"Golden apple snails",[26] spraying pesticides and drying rice after harvesting, to name only some of these activities. Embodied experiences can also come from physical contact with water, soft- and hard-setting soil, rice leaves and pests. They also bodily differentiate via observing the phases of rice growth, tasting different foods and water from various sources, and smelling the fragrance of rice flowers, among others.

There is no doubt that local farmers pay great attention and put great effort into their rice plants. They have to frequently examine and diagnose their rice to ensure appropriate

[26] This snail, *Pomacea canaliculata*, is an exotic pest that first appeared in Vietnam in the late 1970s and in the late 1980s was imported from several countries including France and the Philippines (Plant Protection Department, 2000). This species was considered as a food source for humans but later was recognised as one of the world's 100 worst invasive alien species (Joshi, 2007). Because the golden apple snail brings about significant losses in agricultural production, in particular rice, the Vietnamese government has to deal with its impacts. Nonetheless the snail remains a great cause of concern for farmers (Ngo Thi Thu Thao & Tran Ngoc Chinh, 2016).

support at various stages and to defend against diseases, weeds, algae, golden snails, mice and harsh conditions. Most of them operate as “local experts” about their rice plants – or as their “personal doctors”, as one of participant calls herself. With or without fancy technical tools, local farmers communicate with the plants, the surrounding environment and other related entities through their mundane senses.

This section does not intend to describe *all* locals’ embodied experiences that occur or can occur due the effects of water-related CCAIs in Nam Hung and Quoc Tuan, the two case-study communities. The biophysical appearance of rice is ever-changing and depends on complicated relational, dynamic and generative webs of factors and actors (actants), as mentioned in Chapter 2. There are many means by which locals communicate with their rice plants, surrounding environment and other entities such as soil, water, air, pests, rivers and fish. This section, thus only highlight some of the locals’ embodied interpretations in relation to the effects mentioned in Chapter 2.

Through their bodily experiences with their rice plants day by day, local farmers know whether their fields are at risk. For example, they may notice the plants’ slow progression, leaves looking “stunted” or not “smooth and beautiful”, or roots becoming dark yellow. They may see a thin scum on the water surface, bubbles or algae in the corners of their fields. Sometimes farmers working in these fields notice their nails yellowing or yellow stains on their work clothing, and they can deduce that their fields are acidic, pointing to a need for fresh water and particular fertilisers to avoid the rice plants being harmed, particularly the young plants in the early vegetative phase. Similarly, if they notice that in a particular paddy field the rice plants are longer and bigger and have darker green leaves and more shoots than usual in the late vegetative phase, it is a sign of overgrowth, caused by an excess of particular nutrients, which leads to ineffective production of panicles in the productive phase and ultimately reduces crop productivity.

Local farmers not only pay attention to their rice plants, they also carefully communicate with other entities and the surrounding environment, all of which influence rice growth. For example, as they work in the fields, they can perceive changes in the soil by their bare hands and feet. Many local farmers emphasised that they can assess changes in soil texture, structure, fertility and colour through touch. For example, the soil has become less porous and has lower levels of organic matter, which tells the farmers that the soil is not as

fertile as it used to be. This is because nowadays farmers are encouraged to engage in intensive, high-yield agriculture through the copious application of agrochemicals.[27] In contrast, in the past, when there was more silty water and primarily organic fertilisers such as human and animal dung, the soil had a porous structure and was high in organic matter content.

Similarly, a part-time official, Mr. Lich, who is responsible for controlling the sluice[28] at Dac Chung Bac hamlet in Quoc Tuan, developed his own way of communicating with the river, the water and the sluice**.** Based on his daily netting activities on the Tra Ly River and the folk tide schedule[29] specifying the water's ebbs and flows, he knows how long it takes the salt water to reach his sluice during spring tides. Netting particular shrimps or fish at a particular spot in the river allows him to estimate how far away the salt water is from his hamlet. Through his own embodied knowledge and experiences, he can know how salty the water is. By splashing the water at night and watching how the light reflects off its surface, an indicator of the saltiness of the water, he can ascertain whether it is too late to let irrigation water in to local paddy fields. He has been controlling this sluice successfully in this way for around 40 years and ensures sufficient water for many households in his hamlet.

Like the sliminess of the local ground water on my skin, locals' experiences with the surrounding environment and other entities are not merely determined by their bodies and consciousness; rather, it is the other way around. The yellowness of their nails is not dependent on their biophysical bodies but rather on the pH levels of water, the concentration of particular chemicals[30] of acid sulphate soil, the amount of time spent on specific farming activities, and so on. The chemical formulas and concentrations presenting for varying levels

[27] As mentioned in Chapter 2, in Vietnam, particularly Thai Binh, there has been a political push for the cultivation of up to three crops per year. These crops are the two main rice crops mentioned in Chapter 1 (*Vụ Xuân and Vụ Mùa*) and an extra cash crop. Farmers have been encouraged to maximise the potential of their land, for example through the slogan *Không cho đất nghỉ, không ngừng tay* ta / "Never let land rest, never let our hands stop working". This is similar to the Green Revolution slogan "Make two blades of grass grow where one grew before" (Puig de la Bellacasa, 2017). Many agrochemicals have thus been applied for a long time.

[28] This sluice is used to control irrigation for 1030 households and 150 hectares of paddy fields in Quoc Tuan.

[29] There is a folk poetry describes the tide schedule for the coastal areas in Vietnam's north.

[30] There are high amounts of aluminium (Al), iron (Fe) and sulphate (S) in the sulphate soil under rice cultivation, particular in coastal Nam Hung (Nguyen Van Dao, 2013; UNDP, 2001). Under specific conditions such as waterlogging, low nutrients and high acidity, yellow mottling is produced as a by-product of the oxidation process (Department of Environment Regulation, 2015). It adheres to farmers' fingernails and work clothing, causing yellowing and staining.

of acid sulphate soil are uncertain and dynamic under the impacts of climate change and water-related CCAIs. The yellowness and the locals' embodied experiences are interconnected and depend on weather conditions, the river, water, rice plants, aquatic species and pests that are also various, dynamic, uncertain, relational and generative. These embodied experiences are thus not only formed by locals' bodies but are also affected by more-than-human actants.

While some of these embodied experiences and feelings may be obvious to and able to be understood by outsiders, some may not be. But all of them resemble for the emergence of particular phenomena, such as the sliminess on my skin as discussed in the previous chapter. They are in open conversations with locals and demand responsiveness from them (Bennett, 2010; Latour, 2004a; Massumi, 2002; Puig de la Bellacasa, 2017). In other words, these entities communicate actively, determine how local farmers perceive them and then effectively demand locals to respond in particular ways.

The relationships and communications between locals and other entities are therefore two-way. Through embodied experiences, locals register the realities/worlds of other entities in ways that are different to the supposedly objective and rational scientists, officials, experts and outsiders. It is not only about local farmers affecting rice plants and others on their fields; in fact these entities approach locals actively. The yellow nails, for instance, remind them of the acid levels in their fields, a phenomenon they cannot ignore. Similarly, apart from the discomfort of touching hard-setting soil, it points to a need for more manual effort to increase soil quality. This soil thus reminds locals of the old days when there were large pores in the soil structure and the soil was high in organic matter content. Transparent and clear water conjures up for local farmers the memory of silty water. Spraying pesticides manually many times for one crop create unpleasant odours and brings about the disappearance of native species, which stirs up locals' nostalgia for the aroma of rice flowers without pesticides, the yummy soup made of small crabs and the delicious dish made with golden and fatty grasshoppers.[31]

[31] In the past the local paddy fields were inhabited by many kinds of small species, including both natural pest-control species and pests, for example, small crabs, grasshoppers, mice, leeches and so on. Locals used some of them as food sources, such as small crabs for traditional soup and the fried grasshoppers so popular and nutritious after a hard day working in the fields.

Feelings towards self-cultivated foods and the fear of agrochemicals on the market food discouraged my host from buying rice at the local market. The tastiness of vegetables from soil that was grown with animal or human dung as opposed to commercial fertiliser meant that they (including some of my participants and my parents in law) preferred not to use flush toilets. As my host explained to me after one week of my staying with her family:

> You can see now that, even with the same type of vegetables, there is difference when you eat the ones we cultivated using *phân chuồng*/"animal or human dung". They are more tasty, sweeter and healthier. … I never buy rice from the local market. I don't believe in this kind of product–they might be contaminated with a lot poisonous chemicals. … I feel that only my own self-cultivated rice is appetising and safe for my family members. (1G, 15th Nov 2017)

In the case of Mr. Lich, all of his embodied and habituated affects, which he considers as his "biological hydraulic clock" or sensor, keep him from sleeping at specific times regardless of whether it is night or day, and even from traveling out of his hamlet. He needs to close or open his sluice at the appropriate times to ensure sufficient water. Since it is located in one of the lowest spots in Thai Binh and next to the Tra Ly River dyke, there is a high risk of flooding, which he needs to prevent as much as possible for his hamlet. There is also a need for fresh water for rice farming in the dry season. Working from his embodied experiences, the sluice and the river stick to his body and mind. The official name for this sluice is Dac Chung followed by the hamlet's name, but people there prefer the name *Cống Ông Lịch*/"Mr. Lich's sluice". During our interview Mr. Lich referred to it as "his own sluice", not in the sense of personal ownership for consumption but rather of it being more like a part of his body.

Inter-being relationships

By communicating bodily with other entities including human and non-human, locals are in the webs of relational entanglement with these others. They are interwoven. These relationships are not simple reciprocity but rather interdependence, intersubjectivity and interrelationality (Roelvink & Zolkos, 2015). Relationships between locals and others are not about being *fair*, thereby one gets something from another and then in turn pays it back fairly with something else. In this simply reciprocal relationship one does not need to acknowledge the other because he/she has already paid a fair return. In contrast, the relationship between

locals and other entities can be understood as *Có cái này mới có cái kia*/"inter-being and interpenetration" that is *Đạo lý Duyên khởi*/"Dependent co-arising"–one of core principles of Buddhism (Thich Nhat Hanh, 1997). *Thầy*/ Zen master Thich Nhat Hanh[32] has made clear this important ideology that leads people to act in their daily lives:

> The wellbeing of humans depends on the wellbeing of animal, vegetables and mineral. Humans are made of nonhuman elements, and these nonhuman elements are animal, vegetables and minerals. […] if you destroy this nonhuman being elements [*sic*] you destroy yourself, this is the teaching of inter-being. (quoted from Thich Nhat Hanh's teachings, Sieber, 2015, p. 5)

Thầy normalises this principle by evoking very common entities, thus aiming to support ordinary Buddhist disciples in daily application:

> If you are a poet, you will see clearly that there is a cloud floating in this sheet of paper. Without a cloud, there will be no rain; without rain, the trees cannot grow; and without trees, we cannot make paper. The cloud is essential for the paper to exist. If the cloud is not here, the sheet of paper cannot be here either. So we can say that the cloud and the paper inter-are. … Looking even more deeply, we can see we are in it too. This is not difficult to see, because when we look at a sheet of paper, the sheet of paper is part of our perception. Your mind is in here and mine is also. So we can say that everything is in here with this sheet of paper. You cannot point out one thing that is not here: time, space, the earth, the rain, the minerals in the soil, the sunshine, the cloud, the river, the heat. Everything co-exists with this sheet of paper. (Thich Nhat Hanh, 2009, p. 3)

This explanation is seemingly simple, rational and logical; one might find it similar to the Law of Conservation of Mass in chemistry. The most important point here is a belief in the following: the paper is made of non-paper elements; humans are made of non-human elements; the non-human is made of human elements. Non-human elements are actually part of us as humans. If we destroy any of these non-human elements we can that say we destroy parts of us. Humankind is just one of the actants in inter-being relationships (Escobar, 2018; Thich Nhat Hanh, 2009).

[32] Thầy Thich Nhat Hanh is the most famous Vietnamese Buddhist Zen master. He has been ranked as the second most influential Buddhist leader in the West (Niebuhr, 1999). He was expelled from Vietnam during the Vietnam War (1954–1975) for his ideas advocating for ending the Vietnam War without violence.

Locals may not directly listen to Thầy's teachings, but this mode of thinking somehow embraces them due to the similarity of their family rituals, local customs, spiritual beliefs, daily language and so on. For example, the ritual of *lễ cúng cơm gạo mới* (see section 4.4), where locals offer the first bowl of fresh rice to their ancestors and their gods, clearly displays locals' acknowledgement to all others in relation to their achievement of rice production, as per the first proverb in this chapter's epigraph. For officials who use the lens of rational and scientific thought, this kind of dignified acknowledgment is seen as superstition.[33]

The interdependence and interrelationality can be seen in the way locals take other entities into account in their daily language. An example is the fishermen referring to high water surges in the river as *Ông Sóng*/"Wave Grandpa/Sir", an expression of gratitude and respect and an acknowledgment of the greatness of waves and river in their connection with water. In their perception, the rivers and water are not merely natural resources that are simply inert; rather, they are their great saints or ancestors who provide them with food, livelihoods and life.

Locals perceive and describe changes in other entities as if they were human beings and their family members. During my interviews, locals described rice plants exhibiting disease symptoms as "weak", "baby rice plants" that need help and "extra care", suffering from "overnutrition" or "malnutrition", and through other terms commonly applied to humans. There are a variety of terms that evoke human growth that are used to describe rice-growth phases. For example, when germinated seeds are sown directly into the fields, after one day local farmers describe these seeds as *mộng ngồi*: the *mộng*/"new germinated seed" settling into the nursery–likening the successful establishment of germinated seeds in the fields as infant babies that can survive in their new environment. In another example, when rice seedlings are transplanted, after few days the young plants being to put down firm roots in the ground; local farmers refer to these as people who can *đứng chân*/"stand firmly" after several days of changing into a new environment. In Vietnamese people usually use *ngồi*/"sit" and *đứng*/"stand" in reference to human activity; farmers are appropriating these verbs to describe baby rice plants. Similarly, *Đẻ nhánh*/"tillering newborns"[34] and *Lúa con gái*/"young teenage

[33] My mother, a doctor and communist, deeply disagrees with my father on these kinds of rituals and practices. She, along with many others, calls these practices superstitious.

[34] *Đẻ nhánh*/"tillering newborns" occurs when the rice plant reaches the mild vegetative phase. It starts 5 to 7 days after transplanting (Figure 3, top) or when the germinated seed becomes

girl" are the folk names for the middle and late vegetative phases. The stage where rice plants reach the early productive stage is termed *Đứng cái/Nghén/*"early pregnancy" –at this stage the plants are likened to women in early pregnancy with morning sickness, reduced appetite and a lacking in nutrients. As one of my participants expressed it:

> You know, the rice plants are actually like you. When you are in your first weeks of pregnancy, you don't want to eat, you have less appetite, but your body needs a lot of nutrients for the later pregnancy and your baby in the end. Your body at this stage is very different from when you were a young teenage girl full of energy. Similarly, when they [rice plants] start the stage of *Đứng cái/Nghén/*"early pregnancy" they cannot properly get essential nutrients by themselves. (2L, 1G, 25th Nov 2017).

By personifying other entities in relation to their daily lives both directly and indirectly, visibly and invisibly, materially and immaterially, locals register in other entities' worlds and to some extent *become* others' beings. The wave grandpas, the rice plant babies or the biophysical hydraulic clock are somehow parts of locals' bodies, families and societies. This mode of thinking is quite different to the perspective of objectifying, controlling or seizing water, reflected for example in the governmental CCAI slogan in the note 27 in the page 144 that encourages maximising the use of soil for intensive agriculture production. Locals somehow advocate for living *with* nature. In the work of Roelvink (2016), we could say that locals' empathy is "centered on an understanding of another's 'felt coalescence' that evolves through 'joint agency' or 'co-engagement' in an activity" (p.121). In the same way, locals, rivers, water, rice plants, the surrounding environment and other entities have joint agency and co-engage through mundane daily activities.

In short, the relationships and conversations between locals and other involved actants are two-way or inter-being. There are surely many more examples of joint agency and co-engagement that result from locals' embodied experiences in Nam Hung and Quoc Tuan, but my intention is not to list them all here. Rather, the next section follows locals' embodied experiences to point out potential changes or affective effects due to water-related CCAIs, particularly in relation to local livelihoods. These mutually affective responses are also parts of the local livelihood realities, and they are not recognised by the SLA in Chapter 2**.**

seedling (Figure 3, bottom). The plant then maximizes the number of tillers from its stem (International Rice Research Institute, n.d.).

5.3. Affect of effects and local adaptation

We may agree by now that, when we are in embodied connections and conversations with others, human and non-human, there are two-way communications and relationships. Puig de la Bellacasa (2017) and Healy (2018) describe these two-way relationships as when we touch others, we are also touched by them: there is intra-touching. Via embodied experiences including touching, feeling, smelling, tasting and seeing, locals' perception of the relationships between themselves and other entities is not about control or mastery over others but rather that each side effects and is affected by the other.

Roelvink and Zolkos (2015) point out "being affected", particularly as human subjects are affected, as referring to "force or forces of encounter" that involve "sensual and somatic experiences of feeling, touching, smelling, and so on … and that increase (or decrease) a subject's capacity to act, move and think" (p. 48). These forces compel locals to respond to other entities. Examples of such responses include my host refusing to buy market foods, Mr. Lich's insomnia due to tide regimes and the application of extra fertilisers for rice plants at the stage of *Đứng cái/Nghén/*"early pregnancy"*.* These are *affective* effects due to bodily encounters with other entities in a context of complex change. In other words, the effects of water-related CCAIs have *affect* that has been recognised via embodied experiences, and partly constitutes local livelihood realities.

What is important about recognising affective effects for knowing how CCAIs perform on the ground? It is because current mainstream M&E practices try to measure effects of CCAIs "objectively", scientifically and rationally; however, these conventional practices cannot present affective effects within the interactive processes that constitute local livelihood realities (Guba & Lincoln, 1989; Patton et al., 2015). Exploring affective effects plays a critical role in the meaningful understanding of local livelihood realities. These affective effects make plain the interactive processes whereby locals and others make sense of their surrounding environment and livelihoods in relation to the effects of water-related CCAIs in Thai Binh.

Roelvink and Zolkos (2011) explored affect or affective experiences due to climate change through the example of an Australian farmer, John Weatherstone, who experienced bodily the devastation of his farm due to serious drought and dust storm in 1982. These embodied experiences have affective effects that provoke and open this farmer up to

transformative farming practices. Theorising this kind of affective effect they draw from the work of Gregg and Seigworth (2010), which defines affect as follows:

> Affect [...] is the name we give to those forces–visceral forces beneath, alongside, or generally *other than* conscious knowing, vital forces insisting beyond emotion–that can serve to drive us toward movement, toward thought and extension, that can likewise suspend us (as if in neutral) across a barely registering accretion of force-relations, or than can even leave us overwhelmed by the world's apparent intractability. (p. 45, original emphasis)

It is clear that, locals have gone through processes including the gradual increase of, or sometimes overwhelming surges in, affective effects. For example, local farmers gradually form their farming behaviours to ensure sufficient water and other supplies for the fields based on their bodily encounters with changes of weather conditions and rice plants in various growth phases. In contrast, the embodied experiences of the serious flood[35] in September 2003 in Quoc Tuan were still extremely affecting and even traumatic. One of my participants is still overwhelmed by the memory of her losses and the smell of rice plants spoiling due to this flood. She had tried and failed to protect against the power of the floodwaters. Her pond was flooded and her rice deteriorated, and she lost all her fish and around 70% of her rice crop:

> I tried to protect my pond with sandbags, but you know, the water was everywhere, so my efforts were not enough. All my fish had gone. They [the fish] are so smart–they can find their way get out even with the smallest breach in a [pond] boundary. … Also, my rice crop was significantly reduced. Normally, I could achieve around 160 to 200 kg of rice per sào, but with this crop, my paddy field only gave 50 kg per sào. Many of my neighbours did not even want to harvest their rice and gave it away to people willing to take the rice and in turn clean up the fields for them. (1G, 12th Nov 2017)

The feeling of touch and the connections between local farmers and their rice plants in floods are very compelling. One local farmer said:

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[35] Due to prolonged intensive rain, flooding in the upper stream and high tides, Quoc Tuan was seriously flooded for more than three weeks. The observed data for intensive precipitation reached 749 mm within 48 hours at the Thai Binh meteorological station. Many houses were under roughly two metres of water. This led to mass losses for locals in terms of property, fish ponds, animal husbandry and rice production (NCHMF, 2004).

> We cannot sit idly by and watch our rice plants deteriorating; instead we do our utmost to save them in any way. (1Nh, 15th Nov 2017)

The memories, the smell of spoiled rice plants and the sadness of personal impotence are overwhelming and strongly compelling. From these adverse effects and embodied experiences, there were some affective effects that drove locals' actions, such as surrounding their ponds with high wire mesh. As can be seen in Figure 24, such mesh does not prevent locals' ponds from flooding, but it does prevent their fish from escaping. Many residents in Quoc Tuan also keep cement boats that can support their households in case of serious flooding incidents (Figure 25).

Figure 24: Private pond surrounded by high wire mesh in Quoc Tuan (Photo taken 20th June 2016)

Figure 25: Local cement boats in Quoc Tuan (Photo taken 20th June 2016)

Some farmers continue to cultivate rice on riverbanks.[36] There are different explanations and purposes for this farming practice. On the one hand, local farmers can ensure extra income and food sources for their family. There is no need for agrochemicals or irrigation, and such plantings are very productive. However, as previously discussed, rice production is not the main source of income for locals, and cultivating on riverbanks requires more intensive labour than it does in normal paddy fields. This does not make much economic sense in terms of it being a secondary source of income. In fact, locals engage in this farming

[36] In the past, when agricultural production was the main local income and there were still many young people involved in farming, cultivating rice and other vegetables on local riverbanks was very common in both Quoc Tuan and Nam Hung. Nowadays, this practice has declined, particularly in Nam Hung.

practice mainly to protect riverbanks from erosion and to ensure smooth river flow. This is because before every planting the farmers dredge the riverbed and use the mud to build up the paddy field for their rice. Figure 26 and Figure 27 illustrate respectively a bank with rice cultivation in Quoc Tuan and one without in Nam Hung.

Figure 26: Riverbank with rice cultivation in Quoc Tuan (Photo taken 20th June 2016)

Figure 27: Riverbank with no rice cultivation in Nam Hung (Photo taken 23rd November 2017)

This interpretation explains how locals join in, negotiate and work with other actants in gathering around their shared concerns and then forming appropriate behaviours. Revealing and acknowledging local existing adaptations can be seen as an obvious benefit of experimenting with embodied methods for other kinds of knowing of how CCAIs come about at the grassroots levels. This section also offers more options for officials and higher governmental agencies in their support of locals to adapt to potential risks. There are possibilities for place-based adaptations (e.g., cultivating rice on riverbanks, increasing the height of wire mesh surrounding fish ponds, keeping private cement boats in case of serious flooding). Acknowledging local adaptations can also support locals in proactively devising and organising their own appropriate initiatives. In terms of monitoring and evaluation, this section reveals other realities of the effects of the above-mentioned water-related CCAIs, realities that are not indicated in any official reports.

5.4. Learning to be affected and local adaptation

This section aims to explore processes by which locals seek to transform themselves and collaborate with others to form ongoing behaviours or adaptations. This extends the previous discussion of how affective effects drive locals to respond, think and act.

Affect and already-existing appropriate adaptation

In order to work well together with other entities to enable good livelihoods, locals have always been embedded in processes of learning by doing and doing by learning via their mundane senses. They have been learning and relearning bodily from their own rice and other entities for themselves for appropriate farming activities rather than just following the "cerebral knowledge" transferred from others, for example their parents, their elders, specialists or textbooks. In the case of serious flooding in Quoc Tuan, locals learnt bodily from their losses and unsuccessful adaptation.

Gibson-Graham and Roelvink (2010), like other scholars, claim this learning is "not learning in the sense of increasing a store of knowledge, but in the sense of becoming other[s], creating connections and encountering possibilities that render us (them) newly constituted beings in a newly constituted world" (p. 322). This is "learning to be affected" by other entities. This lets more differentiated worlds into the discourses by which we matter and then become more sensitive to other beings (Cameron et al., 2011; Latour, 2004a; Roelvink, 2015a).

Interestingly, this learning is in our instincts when we bodily engage with or encounter other entities, as Latour (2004a) states:

> [T]o have a body is to learn to be affected, meaning 'effectuated', moved, put into motion by other entities, humans or non-humans. If you are not engaged in this learning you become insensitive, dumb, you drop dead. (p. 205)

He illustrates how the human body embarks on processes of learning to be affected via the example of how people with "untutored noses" learn to become professional "noses" in the perfume industry. In Latour's language, the untutored noses are the "dumb noses" who before training could not discriminate between "sweet" and "fetid". In the process of learning to be affected, the professional noses discriminate more and more subtle odour differences. After a week-long session with the support of "odour kits", chemists and equipment, these

dumb noses are trained to distinguish the subtle differences between fragrances. We can see the same process at work in many places, including Thai Binh.

An example of this learning to be affected is the case of my fishermen hosts and Mr. Lich with his sluice in Quoc Tuan. In particular, the fishermen negotiate with other entities including the surrounding environment and other creatures to form their specific activities in specific circumstances. Hydraulic ebbs, fish and shrimp behaviours, tide calendars, official flooding alerts and information, and weather conditions are all involved in fishermen making their decisions as to when, where and how they can net for more fish and shrimp. When my hosts[37] started fishing more than thirty years ago, they could not differentiate between the various movements of aquatic species and water ebbs during Tra Ly River flooding incidents. However, they have undergone many "practice breakdowns", in which they may miss certain opportunities for good netting or lose nets to powerful water at particular places and times. The situation was repeated when the government built the Hoa Binh Dam, which changed the river's flow and flooding patterns in downstream areas, changes by which these fishermen have been learning to be affected in order to seize the opportunities for better netting. Before the Hoa Binh Dam construction, when there was a flood warning, fishermen often collected all their nets and facilities. Now, when the flooding alerts are milder, they continue to net, and even get more fish and shrimp than usual. This is because upstream dams have increased the lag time for flood peaks to reach their downstream site while there were still some changes in hydraulic conditions, so fishermen can make use of these precious moments for netting. Similarly, in the early days, Mr. Lich could not differentiate between different types of water movement, either vertically amongst layers or in terms of the speed of fresh water flowing down from the upstream reservoirs or the salt water coming up from the sea. His biophysical hydraulic clock and other know-how, like the professional noses, were not there from the first days with his sluice. In both these cases, the bodily experiences had to be lived through and developed into embodied knowledge. Their bodies are only able to "talk" about the changes in other beings after prolonged practice, similar to the week-long training sessions for the dumb noses with the odour kits.

[37] My host family in Quoc Tuan do not fish for a living; they are farmers whose houses are next to the Tra Ly River. Fishing is an extra livelihood activity to supplement the household income and food sources. The husband did not even know how to net before his marriage with his fishing wife more than thirty years ago.

With learning to be affected, the more we become sensitive to the differentiated worlds, the more possibilities we have and the greater our capacity to act on potential changes. The more locals encounter differentiated worlds, the more they become articulate about change (Latour, 2004a). Articulate here means not just "able to speak authority, but articulate in the sense of being more affected by differences, more resonant with the world around" (Cameron et al., 2011, p. 496). In the examples of Mr. Lich and the fishermen, they had communicated bodily with the Tra Ly River before the construction of upper-stream reservoirs; their bodies had already learned to be affected by other entities such as the river, tides and aquatic species. After the construction of the upper-stream reservoirs and other governmental interventions (perhaps including climate-change impacts) new differences appeared in relation to these entities. With the processes of learning to be affected, their bodies thus become more resonant or more sensitive to the effects of the interventions mentioned in Chapter 2, as well as to changes in the surrounding environment and in the worlds of other entities.

In short, locals have been (un)intentionally learning to be affected by the more differentiated worlds of rivers, rice plants, tides, aquatic species and other entities, which forms their effective behaviours. They have affectively sensed the effects, learnt, built up, collaborated and then formed particular effective behaviours such as appropriate fishing practices, controlling the sluice or taking care of rice plants. More importantly, these affective effects have supported locals in adapting to the uncertainty of climate change and the unexpected effects of water-related CCAIs in the two case study communities, Nam Hung and Quoc Tuan. However, these affective effects are blurred and marginalised, and may even be considered as backward due to current perspectives of government on CCAIs that are closely associated with development programmes and are scientifically oriented, which must certainly be applied to their M&E practices and the modern outcomes desired and expected.

Affect and ongoing adaptation

I have explored the process whereby locals have been "learning to be affected" to experiment and develop their appropriate and effective adaptations to changes due to climate change and water-related CCAIs. Here, my other intention in drawing from the concept of "learning to be affected" is to pull out the intangible and ongoing (even imperceptible) affective effects or responses in relation to local livelihoods. In doing so I explore a particularly serious

disease epidemic that hit local rice production in Thai Binh in *Vụ Mùa* 2017 as a typical example of how affective effects manifest and form local potential adaptations to this disease under complex change.

In 2017, an epidemic of plant disease caused a massive decrease in rice crop productivity during *Vụ Mùa*, when some households experienced only 20–30% of their productivity.[38] The disease is related to the *Virus lùn sọc đen*/"Southern rice black-streaked dwarf virus*"* that is carried by the *Rầy lưng trắng*/"white-backed planthopper"/*Sogatella furcifera.* This disease degrades rice plants significantly (Dang Thi Ngoc Kiem, 2011). The appearance of white-backed planthoppers in local fields is annual and common. The main factor in the boom of the virus is clear–it is white-backed planthopper (Dang Thi Ngoc Kiem, 2011). This disease also occurred in Thai Binh in 2009 with less loss. The question is, why did this disease epidemic boom and devastate local fields only in *Vụ Mùa* 2017? There is a lack of clarity as to the main factors and actors in the development of the white-backed planthopper and the virus being carried by this pest. Not many scientific reports explain fully and empirically the causes of this disease epidemic for Thai Binh and surrounding provinces. Some influencing factors have been pointed to by both locals and specialists, including hotter weather[39] at the stage of *Đứng cái*/"early pregnancy"*,* organic toxicity and locals' carelessness in eliminating white-backed planthoppers.

However, locals mostly consider that the main reason for this epidemic was governmental interventions causing organic toxicity, and in particular, an intervention combining water-control plans and the adjustment of local cultivation calendars (see detail in Chapter 1). This intervention aimed to offer an extra cash crop (*Vụ Đông*/"Winter crop"[40]) while avoiding the storms and floods that often hit Northern Vietnam around September and October and that are arriving later because of climate change (IMHEN & UNDP, 2015). Using proactive water management, authorities have set up the basics such as water management and cultivation plans for starting *Vụ Mùa* earlier. This means *Vụ Mùa* starts in early June, instead

[38] Data from individual interviews just after the locals' harvesting and local preliminary official statistics.

[39] According to meteorological data at Thai Binh station, there was a slight increase in temperatures in late July and early August 2017.

[40] *Vụ Đông* or cash crop often starts after the *Vụ Mùa* harvests and ends before *Vụ Xuân*. Local farmers may cultivate various types of vegetables. This crop to some extent earns more income for farmers than the two main rice crops. However, due to water availability, soil properties and labour sources, there are not many local fields that can meet the requirements for this crop.

of the usual late June or early July, and finishes around late September or early October. In this way locals may avoid strong storms at harvesting time. This intervention can also make more time for *Vụ Đông*. If they follow the usual cultivation plan, locals might not have enough time to plant cash-crop vegetables. However, in 2017, *Vụ Xuân* was not finished until late May, and meanwhile officials had set up for *Vụ Mùa* starting early June. In order to work with this official cultivation plan, locals had to shorten the interval for preparing and cleaning their land to only around two weeks (and even shorter for some households) for preparing and cleaning up their land, a process should take around three weeks in hot-weather conditions. In addition, as it was raining and cool at that time in Thai Binh, remnant vegetation, potential pests and insects were not composted and eliminated properly by heat. Many of my participants including local officials and agricultural specialists believed that this improper land preparation and field cleaning were influencing factors for this epidemic of Southern rice black-streaked dwarf virus in both Nam Hung and Quoc Tuan, even though this was not backed by official reports.

While picking green tea leaves for sale at the local market, Mrs. Tuat, a farmer in Quoc Tuan, discussed this incident:

> It was too *short* (strong tone). They [earthworms, bacteria, and others] are like us. They need time and appropriate conditions to do their jobs. You know, at that time, it was raining a lot; the weather was not warm enough for them to work properly. That is the reason why only some of those [who inhabit] at the top [soil surface] could work properly. But they [the governmental officials] seemed to not know that, or they might, but they still asked us to start our *Vụ Mùa* earlier. … Our rice grew well till the phase of *Đứng cái/Nghén/*"*early pregnancy*". The rice only deteriorated significantly when they started rooting into the deeper layer where the soil was not good enough due to the short land preparation period. … They (the officials) then tried to blame the weather conditions for the development of this epidemic, but we don't think so… If our rice plants could grow well, they could perhaps better resist the Southern rice black-streaked dwarf virus. (1T, 15th Nov 2017)

When I questioned her further as to what she thought about the potential floods and storms that this government intervention meant to avoid in pushing local cultivation plans earlier, she reluctantly answered:

> Well, they [officials] based it on weather forecast; it was just a forecast, and forecasts are uncertain. Also you know that *Trời sinh voi, trời sinh cỏ*[41]/"gods create elephants, gods will create grass". We cannot control *Ông trời*/"gods", so we should do our best and then we will work out ongoing incidents when the time comes. (1T, 15th Nov 2017)

One may claim Mrs Tuat's perspective as a defeatist attitude of submitting passively to the spiritual gods. This is true to some extent and can have negative effects in terms of adaptation. However, despite the fact that Mrs Tuat and other farmers accepted the failure of their crop in *Vụ Mùa* 2017, for them it is not about giving up on doing any further adaptation but rather inspires/drive for more attentive practices in the future to do their best. Doing their best here is not about exploiting nature's resources in according to a productionist agricultural logic or for human consumption. Rather, it is about learning to be affected, becoming others' beings, and then surviving well together.

My host in Nam Hung also talked about this plant disease:

> Well, there was nothing we could do. It was hopeless. […] This was the will of the gods. […] However, we are now still considering different causes for our failure this year. The most important thing is to re-think, re-examine, and learn from that. So we can at least further experiment and find appropriate solutions for other crops in the future. We will wash our land properly and observe our rice and other related factors more intensively and attentively. We still worry, but also hope that we will not have to suffer another loss we did this year. (2H, 5th Dec 2017)

Losses due to this disease epidemic in *Vụ Mùa* 2017 caused embodied feelings of apprehension (akin to shivering) for local farmers like Mrs. Hoi and Mrs. Tuat, even though they had experienced a less-serious epidemic of the Southern rice black-streaked dwarf virus in *Vụ Mùa* 2009. These feelings of helplessness, like nothing could be done, or other overwhelming feelings have effects which forced them to the stage of moving, thinking and acting as best they could. These affective effects led Mrs. Hoi's to ongoing plans for rethinking, re-examining and working collaboratively with others in relation to this disease, for example thoroughly preparing and cleaning up her field and being more cautious about pests. These affective effects can make plain why Mrs. Tuat prefers a longer interval between the two main rice crops for better land preparation no matter what the forecast might predict.

[41] This Vietnamese proverb is similar to the Czech proverb "Each day brings its own bread."

Through their bodily engagement and connections with other entities, Mrs Tuat, Mrs Hoi and other local farmers can recognise and understand how they work, feel and react with involved actants in relation to their farming practices. Their response to other entities may not be based on particular statements that have "definitive authority" or ultimate positions of "true" or "false", "right" or "wrong". Rather they, to some extent, are driven by propositions, indeed *subjective propositions* (Latour, 2004a). Here propositions "describe what is articulated" (Latour, 2004a, p. 212). This implies the acceptance of negotiation in the process of making a statement from involved actants. The propositions that someone conceives due to the processes of learning to be affected are *not* non-negotiable and obstinate statements based on thinking with matters of fact (see Chapter 3). The processes of forming new propositions can be negotiable, and the things involved do not necessarily belong to particular sides in dualist relationships. The propositions are formed by involved actants that do not need to be claimed as, for example, scientific, relevant, rational and defined, or non-scientific, irrelevant, irrational and undefined. More importantly, the negotiation process is never ending: we can be always in the process of receiving, and becoming more sensitive to more differentiated worlds. This means that local livelihood realities are somewhat and somehow constituted by intangible effects and always in the process of becoming.

Like many other local farmers, Mrs Tuat and Mrs Hoi did not only base their actions on official reports or recommendations on the Southern rice black-streaked dwarf virus from local officials in this particular case. They do not form their farming behaviours or plans merely on the basis of knowable futures or "knowing beauty", in the words of Wright (2017); rather they have learnt "how to feed off uncertainty" (Latour, 2005, p. 115). For local farmers, "[k]nowing is not about prediction and control but about remaining '*attentive* to the unknown knocking at our door'" (Deleuze, original emphases, cited in Puig de la Bellacasa, 2017, p. 91). This is similar to the way that Latour (2005) urges us to deploy "matters of concern" (see Chapter 4). They are willing to go with "intense engagement and involved experimentation" (Escobar, 2018). Or as (Puig de la Bellacasa, 2017) would argue, these ongoing practices are similar to "thoughtful and protracted observation" or "immersed observation" (p. 201) with others, offering us more time to be able to understand the life cycles of others, and then collectively and collaboratively participate in the negotiation process to form particular realities.

These affective effects on Mrs Tuat and Mrs Hoi, mentioned above, may not result in any new effective farming behaviours. These affective effects are different to those due to the serious flood in 2003 in Quoc Tuan that supported locals forming their place-based effective behaviours such as cultivating on local riverbanks or erecting high wire mesh around fish ponds. Mrs Hoi's plans may not bring about any obvious and material outcomes or transformative changes. However, she has become more articulate in terms of holding a more differentiated farming production. The affective effects and new propositions, including her thoughts, concerns, hopes and so on, are still there and drive her in the processes of (un)making decisions later.

In short, by harnessing the concept of learning to be affected, I have demonstrated how local livelihood realities are formed by not only tangible and material effects but also intangible and ongoing affects. These intangible and ongoing affects are locals' thoughts, concerns, hopes and the desire for the longer interval; they can also be nostalgia for silty water, the perfume of rice flowers, good soil structure, cultural and spiritual beliefs and religious factors, amongst others. They are elusive, uncertain, irrational, non-scientific and undefined; however, they are still there as actants in a complex and messy entanglement, driving locals in the processes of (un)making local livelihood realities. More importantly, they are important in assessing and knowing the effects of CCAIs on the ground.

5.5. Conclusion: Meaningful knowing of the effects of climate change adaptation interventions

This chapter has shown how an alternative to M&E can help us to know about the effects of water-related CCAIs. This alternative, based on embodied knowing, has brought a different interpretation from the one described in Chapter 2. This interpretation is significant and meaningful, making plain why and how water-related issues and relevant interventions matter for locals. In particular, I began by exploring how locals (un)intentionally communicate, experience and engage with other actants in relation to their farming activities. They have communicated and built up their relationships with others via their mundane senses within their daily lives including through local culture, religion, customs and family rituals. Locals are not merely recognising the roles of other actants, such as water, rice plant, the river, and the soil, as resources for achieving livelihood outcomes. Locals see themselves as a part of the

web of relational entanglement with other actants. Via daily language and activities, locals to some extent become others' beings. They affected and have been affected by other involved actants. In other words, locals have been compelled, put into motion and effectuated by other actants, which affects their capacity to act, move and think in response to changes in relation to climate change and water-related CCAIs. The connections between locals and other involved actants are not simply reciprocal; instead they are interdependent and inter-relational. Their communications and relationships are two-way and inter-being.

To theorise these two-way relationships and communications, I have harnessed the concept of "learning to be affected" developed by Bruno Latour. From this, I have considered the affective effects of water-related CCAIs in two case-study communities, Nam Hung and Quoc Tuan. These affective effects show the processes of forming place-based behaviours to adapt to change. These affective effects are uncertain, dynamic and generative.

For locals, these affective effects are very meaningful, significant and realistic. This is because they can support the creation of possibilities towards practical solutions in specific situations. They can lead to obvious and material incarnation, for example the biological hydraulic clock of Mr. Lich or the effective behaviours that locals in Quoc Tuan came up with after the serious flood in 2003 such as cultivating rice on riverbanks, surrounding fish ponds with high wire mesh or keeping a private cement boat in case of a serious flood. These affective effects can also hint at intangible and ongoing responses such as the thoughts, concerns and worries of local farmers with respect to the disease epidemic of the Southern rice black-streaked dwarf virus, their nostalgia for the old days with comfortable feeling of touch to good soil structure or the fragrance of rice flowers, and plans for extra care for rice's being. These intangible and on-going responses may not refer to particular effective behaviours. However, through interactive processes, these responses constitute the (un)making adaptations. These kinds of climate change adaptations are place-based, flexible and responsive; they are formed collectively by many involved actants including the locals as well as non-human entities such as the land, soil, water, local customs, culture, spirits, religion, which matters for locals. These potentially appropriate solutions are much more diverse and adaptive than are government-led interventions.

More importantly, affective effects, including tangible, intangible and ongoing responses, are mundane, instinctual and inseparable within any embodied conversations and

connections. They form and are part of local livelihood realities. However, they are absolutely not presented in official reports, which are based on mainstream M&E practices. As a result, there is ignorance, downplaying and omission of local place-based and situated behaviours, and of course of intangible and ongoing adaptations, in official reports and among the wider public. The critical point here is that, locals with their embodied experiences and engagement with other actants have somehow known how to deal with uncertainty and unpredictability, and being ready for the unknowable futures such as floods and plant diseases under climate change context. In contrast, the government with its large and rationalist CCAIs seemingly does not achieve what they expected, and also can create maladaptation in terms of climate change adaptation (Chapters 1 and 2). This chapter, thus confirms again for a need of change in our practices applying to know the effects of CCAIs. This also raise a need for re-thinking on how we should do climate change adaptation, and whether or not we should learn from locals in responding to the changes within their farming project.

I am now approaching the final research question set out in the Introduction to this thesis: What then should researchers and evaluators do to put the needed changes (the research findings) into practice? Or more simply: So, what's next for more appropriate climate change adaptation? The next chapter therefore will emphasise on what researchers and evaluators should learn from local farmers for more meaningful and significant outcomes from their work in terms of climate change adaption.

CHAPTER 6

EMBODIED KNOWLEDGE FOR AN ADAPTED WORLD

> It is not that we should simply seek new and better ways for managing society, the economy and the world. The point is that we should fundamentally change how we behave.
>
> —(Havel, 1992, cited by Chambers, 2017, p. 149)

> Thinking with your hands, doing your hands-on conceptual work.
>
> —(Escobar, 2018, p. 34)

> [T]oday the small is no longer small and the local is no longer local.
>
> —(Escobar, 2018, p. 163)

6.1. Introduction

In response to the local adaptations conveyed in the previous chapters, some might say that locals follow their rituals, customs and perhaps intuitive senses because they don't know how to control what Gibson, Rose, and Fincher (2015) call "Earth others". According to this thinking, locals, to some extent, lack competence in dealing with the threats of climate change and natural disasters to their livelihoods. Moreover, the entanglement between locals and the entities that surround them is complex and messy. I admit that I cannot distinguish which local behaviours are aimed at consumption, which are aimed at reparative work with other entities and which stem from fears of the consequences of Mother Nature's anger. Locals engage with their farms and other entities objectively, subjectively, unintentionally and intentionally. These entities are not just tangible, obvious, credible and scientific but also intangible, elusive, incredible, spiritual and affective; indeed, they are actants or lively things. They are both human and non-human. Locals gather and assemble with involved actants around particular concerns such as the health of a soil ecosystem, fish lost during floods, riverbank erosion, rice plant babies, early pregnant rice plants and so on. From all these processes, they produce specific knowledges to form behaviours and solutions appropriate for their specific circumstances. My argument here is that locals work attentively, affectively, effectively and bodily with the surrounding environment and other actants to produce valid non-academic, embodied and useful knowledge, and ultimately to come up with their own appropriate and meaningful adaptations.

To broaden out the role of embodied knowledge in forming practical possibilities or changes for climate change adaptation, this chapter explores the effects (indeed affective effects) of embodied knowledge on people like me, as a researcher, governmental official and independent evaluator. It addresses some questions that researchers and evaluators might ask themselves: What we can do after becoming aware of critiques (coming out of our research doings) of water-related CCAIs (Chapter 1 and Chapter 2) and the mainstream M&E practices associated with them (Chapter 3)? With an awareness of the pitfall of the conventional scholarships (MoF) (Chapter 3) and the possibilities of the alternative one (MoC) (Chapter 4), what we can do to implement the needed changes? Can research such as this PhD project produce "a practical form of knowledge" for climate change adaptation (Fazey et al., 2018)? What can we learn from locals in dealing with uncertainty and unpredictability within

their farming projects? And finally, can we mould our research outcomes so that they are not "just" critical documentary or naïve recommendations but rather action-oriented adaptation?

In doing so, this chapter starts by theorising the process of knowledge production and local embodied knowledge through the two concepts of "research in the wild", developed by Callon and Rabeharisoa (2003), and "matters of care", developed by Puig de la Bellacasa (2017). It scrutinizes the process of making the local knowledge and acknowledge it as to the contribution for the on-going or developmental *effects* and *affects* driving locals on their farming projects for better worlds and futures. The following sections then re-visit to the scholarships common in doing climate change adaptation research or in doing M&E of interventions mentioned earlier in the thesis. It then discusses what and how a researcher and evaluator can learn from locals to become more adaptive and responsive in the context of an uncertain climate (changing) world.

6.2. Local embodied knowledge

There is no doubt that in the process of forming appropriate and meaningful adaptation, local farmers in Vietnam produce their own useful knowledges. Embodying the democratic assemblies of all involved actants, many locals traditionally and bodily acknowledge all information in a non-dualist way, and they produce embodied knowledges.

The process of making local embodied knowledges and research in the wild

In local farming projects in Thai Binh I suggest that bodies are platforms and instruments for locals to experiment with in order to visualise and record the different contexts of their own farming practices, weather conditions and other involved actants. Reiterating these kinds of experimentation and refinement, locals have gradually produced their embodied knowledges. These embodied knowledges are useful for them in adapting to changes due to climate change or to relevant CCAIs. For example, in experiencing the sliminess on their skin from touching shallow ground water in the dry season, locals create appropriate solutions for domestic water demands under specific circumstances. According to particular levels of sliminess and smell of shallow ground water, they may use the water for showering and washing their clothes but stop using it for washing produce; and if the sliminess worsens they might stop using the water for all domestic purposes until there is enough rain or local rivers

have been replenished by freshwater and the water in their household wells improves. Another example is levels of yellowness in finger- and toenails; in experiencing changes in the yellowness, local farmers can know when and how they need to work to reduce the level of acidity in their fields. If their nails do not get dark yellow after a long day's work, they may need to withdraw this water and reirrigate; in worse scenarios, they may need to apply extra fertiliser; and some farmers have even had to replace the top layer of soil.

Callon and Rabeharisoa (2003) call the processes where non-scientists produce knowledge as "research in the wild". This concept is developed from their work with the French Muscular Dystrophy Association that brings together people connected to muscular dystrophy (MD). Specialists, doctors, scientists and laboratory researchers have worked collectively and collaboratively with patients and caregivers to produce new and useful knowledge on muscular dystrophy. My contention in drawing from this is that locals are not researchers or scientists; they are seen by some as intuitive or backward. Yet they are professional farmers who bodily encounter other actants and produce useful local knowledges. There are back-and-forth reiterations, experimentation and refinements within the process of knowledge creation. These knowledges, even if non-academic, are useful and valid.

In the project outlined by Callon and Rabeharisoa (2003), all actants are brought together to form collective bodies and work in collaboration, regardless of different forms and boundaries such as identities as professionals and laypeople. The professionals to some extent become lay researchers, and vice versa, in relation to shared concerns, in this case around muscular dystrophy. The laypeople have worked as professionals at various points with their proto-instruments such as private cameras, photos, family clips, journals, testimonies, spontaneous letters to record, share and disseminate information, embodied feelings and experiences, as well as know-how. They have also been willing to open themselves to learn about and accept biomedicine and other scientific practices. The professionals, in addition to using scientific data, have worked closely with laypeople to learn from them. Professionals become more sensitive to patients' lives due to their embodied experiences of engaging and connecting with patients and laypeople from bench to patient beds. With "research in the wild", all information about and generated by laypeople is given proper consideration by professionals. All information for new knowledge is on an "equal footing". The lay doctors and lay professionals embrace new professional identities and

careers that are different from the conventional and objective research stance (Callon & Rabeharisoa, 2003). In turn, some laypeople or patients, so-called amateurs, with their embodied knowledges have become full-fledged authors and academics (Callon & Rabeharisoa, 2008). There is thus close colloboration between lay professionals and laypeople, where “there is no fundamental difference of status between knowledge produced by patients and that produced by researchers or clinicians” (Callon & Rabeharisoa, 2003, p. 197).

In local farming projects, research has been conducted “in the wild”. Locals have been working with other involved actants as lay professionals or lay researchers, and other actants have become laypeople. Similar to the professionals work with all information from the proto-instruments of caregivers, the scientific apparatus and their embodied engagement with patients and lay-people in the work of Callon and Rabeharisoa (2003), locals consider all involved lively actants to form collective bodies and work in collaboration with them. In the case of acidic fields, apart from the level of yellowness of nails, the darkness of surface soil, bubbles, algae and a thin layer of scum on the water surface contributed to farmers’ decisions as to how to deal with acidic fields. Alternatively, local embodied knowledge of ground water is not based only on sliminess but also on the smell and saltiness of the ground and the colour of the water in very dry weather. These lively actants are somehow uncertain, dynamic, multiple and even generative. Therefore, embodied entanglement between locals and other actants “shifts and changes, is always in flux and is related to our interactions with sentient others, human or non-human” (Tilley & Cameron-Daum, 2017, p. 9). Local embodied knowledges are in flux, undefined and irrational. Yet this does not mean that local embodied knowledges formed by this kind of process are intuitive and untrustworthy; rather, they are produced by collective bodies and close collaborations. Local embodied knowledges are collective, situated, dynamic and generative, and more importantly, they are useful, like new, useful knowledge produced by the French Muscular Dystrophy Association.

Affectionate knowledge and the scholarship of “matters of care”

In my study, local relationships with other actants in the process of knowledge production are much more closed than what Callon and Rabeharisoa (2003) describe in their study between laypeople and lay professionals. Chapter 5 has illustrated the relationships

among local farmers and other involved actants, human and non-human, around their farming concerns. These kinds of relationships have been described as two-way communications, joint agency, co-engagement, inter-being, intra-touching, interdependent, interrelational, and intersubjective. Local farmers have become “more-than-human”; they are “being-in-common”, like other non-human actants (Gibson-Graham & Roelvink, 2010). They affect and are affected by other actants. Embedded within these relationships, locals navigate or at least negotiate with other actants to make farming decisions that sometimes negate productionist logics, particularly that of high yield. An example is Mrs. Hoi (Chapter 3), who accepted a lower yield in refusing to use too many pesticides in reaction to plant disease. Another is Mrs. Tuat, who was frustrated with the short time interval between *Vụ Xuân* and *Vụ Mùa* in 2017, particularly mentioning the need for enough time for the species gathered in the soil to do their job, and also her wish to do her best to follow the rules of Mother Nature rather than arbitrarily force other actants to fulfil human demands. These are similar to local farmers with their practices in dealing with rice plant babies, early pregnant rice plants and rice plant diseases.

The local mode of thinking is not about only caring for the health of the soil or the rice plants in order to better serve productionist logics, such as high yields and extra cash crops. Rather it is about responding to and ensuring the broader subsistence of soil ecosystems, rice plants and other non-human actants. Their behaviours or adaptation are based not only on the effects of CCAIs and climate change but also the affect of these effects—or affective effects—such as emotion, values, cultural beliefs and so on (mentioned in Chapter 5). Locals take into account the balance between their bodies, themselves (e.g., their expected yield and incomes, expectations, spirituality, and so on) and other actants (e.g., rice plants, soil, rivers and aquatic species, amongst others), which they “seek to interweave in a complex, life-sustaining web” (Tronto, 1993, cited by Puig de la Bellacasa, 2017, p. 54). Within such a web they care with, care for and are cared by other actants, particularly non-human entities. Puig de la Bellacasa (2017) terms the knowledge produced from these processes as “affectionate”. Affectionate knowledge is not conventional or epistemic one for the purpose of mastery over particular things. Rather it is expressive, attentive, open, forthcoming, emotional, communicative, responsive and approachable.

This “affectionate” mode of thinking is somewhat different from the “matters of concern” scholarship discussed previously. The democratic assemblage to some degree cannot

account for how locals chose to work for or to take more seriously concerns and cares for some particular things and not others. There is more to it than just ensuring equal voices for all actants in parliament, and not just for finding the best solutions or responsiveness to a particular concern. For example, for the elderly farmers, their affectionate knowledge about rice plants in conditions of saltwater intrusion or water scarcity leads them to making certain commitments, such as spending more farming time, money and intensive labour on public irrigation canals regardless of the farmers' age constraints and the productionist benefits. Affectionate knowledge leads them to not merely care for the rice plants in vulnerable phases through ensuring the necessaries such as extra fertiliser or more intensive labour, but also to care for what rice plants care for. For example, they consider silty water *mát/*"fresh" and *ngọt/*"sweet" for rice plants, much the same way human beings enjoy a cool and nutritious drink after a long period of being thirsty and hungry.

Thinking with "matters of concern", for example in the simple statement "I am concerned", one can have thoughtful knowing on a particular concern even if they do not necessarily act on it, whereas with affectionate knowledge and the statement of "I care", one easily shifts from an affective state into a doing state (Puig de la Bellacasa, 2017). The critical point here is a notion of *doing.* Affectionate knowledge on particular issues leads locals to act upon particular concerns with commitments that ensure their actions for others.

In addition, embodied knowledge always requires a direct material engagement, for example, the engagement of local bodies and other actants such as water, plants, soils and pests (Puig de la Bellacasa, 2017). This knowing is not separate from the world of materiality. Thus local affectionate *doings* are always in connection with the material world. Local daily practices are actually locals' affectionate doings that are always in relation to the material world. That material doings can start with, for example the affective effects on rice plants of serious flooding, saltwater intrusion, cold weather or water scarcity. Deteriorated rice plants demand care, which leads to local responsiveness on the part of those who need these plants, and somehow commitments, which then turn into particular physical work. Other local material work can be seen in the erection of high wire mesh around fish ponds, willingness to transplant rice in the coastal community regardless of the long hours of toiling in hot weather, extra investment and intensive labour in the fields brought about by a late crop (mentioned in Chapter 2).

This kind of material work, or affectionate doing, is clearly embodied, collective and affective, and it manifests and performs within a complex, life-sustaining web. Puig de la Bellacasa (2017) calls this mode of thinking as “matters of care”. She clarifies this scholarship as following:

> [T]he notion of “matters of care” is a proposition to think with: rather than indicating a method to “unveil” what matters of fact are, it suggests that we engage with them so that they generate more caring relationalities. (p. 66)

Locals manage to generate more caring relationalities amongst themselves and other actants. This mode of thinking is not mastery over the soil through adding more agro-chemicals. It is not about the idea that soil ecosystems cannot do anything for themselves and need external intervention from locals (in the case of shortened land preparation, discussed in Chapter 5). Rather, it aims to nourish, work collaboratively and care along with those actants for better soil preparation. Thus locals can in turn be cared for by those actants and their caring doings, for example the good feeling of using less agro-chemicals, the comfortable feeling of touching porous soil, rice babies happy in good nursery fields, high chances of successful crop and so on. This mode of thinking forms all local farming practices and their commitments to do with others for their material work of care.

We can use the work of Tronto (2013) to theorise these local daily activities as “caring with” practices. These practices position locals and other non-human actants within their communities as decent citizens. They, the citizens, “think closely about their responsibilities to themselves and to others” (p. x). Locals’ commitments to do certain things for and with others are indeed their responsibilities to themselves and to others, even for those who are weak or do not want to raise their voices in the democratic parliament. The locals’ “scholarship” in doing their farming projects is one of “matters of care” in the work of Puig de la Bellacasa (2007).

Action-oriented knowledge

It may be clear by now that locals do not apply scientific or rational methods to answer the question of how they can understand accurately the effects of water-related CCAIs. They work their farms based on using their own senses to notice changes, produce knowledge and act. Their embodied and affectionate knowledge that forms and is formed by local

commitments and responsibilities does not focus only on identifying the problems with their rice plants, soil, water and so forth. Rather, they focus on questions of “how to”: How to do more appropriate adaptation? How to instigate the needed changes that they know well enough in practice? For example, to address the potential for floods in Quoc Tuan, locals did not focus on how accurately they can predict flooding in terms of intensity and magnitude, a difficult task in a climate-changing context even for hydrologists and meteorologists. Rather, they accept the risk of floods and focus on how they can deal with these kinds of problems or concerns as they arise. This attitude is similar to what inspired Gibson-Graham et al. (2019) in their compelling lecture on how economic geographers should do their research in era of climate change and the Anthropocene, exemplified in a passage they quoted from Howard G. Roepke, in which he urged scholars to

> study obvious problems and to be bold enough to advocate the solutions that their research indicates would be useful.″ […] ″There is no need to search for problems—many already exist and are recognized by everyone.″ (Roepke, 1977, quoted in Gibson-Graham et al., 2019, p. 2)

Like these economic geographers, locals seem to have enough understanding of floods, rice health in weather difficulties and other concerns to seek solutions. From my perspective, locals in Thai Binh, the lay professionals and laypeople in their farming projects, **do not follow the trend of academics who attempt “to make academic knowledge or theory more practical, rather than focusing on development of practical forms of knowledge**” (Fazey et al., 2018, p. 61). However, being bold enough is not about ignoring what we do not know and only going forward blindly. Rather, basing themselves on collective, responsive and affectionate knowledge, locals bring multiple possibilities to obvious problems. They even seek to act ethically to ensure the life-sustaining web instead of acting politically, as with the “matters of concern” mentioned previously. A group of climate change thinkers, Fazey et al. (2018), would characterise local embodied knowledge as “how-to” practical knowledge, an action-oriented or practical form of knowledge.

In short, locals deploy the practices of “matters of care” and engage in their farming projects as “research in the wild”, which requires them to care for, care with and be cared for collectively and collaboratively by all other involved actants within a complex, life-sustaining web. Local embodied knowledges are therefore not backward, intuitive or untrustworthy, as

some would say, instead being appropriately collective, responsive, situated, affectionate, and especially, adaptive and actioned-oriented to the obvious problem of our time, which urges them carry out their material work of care within their farming projects.

6.3. The researcher's embodied knowledge and climate change adaptation

How then as professional researchers can we (re)develop the knowledge and skills that lay people already have? How do we learn from their adaptive and affectionate inter-being with place and with obvious concerns? This section examines what can I learn as a researcher and how can I account for my value and positionality in doing CCA research as well as M&E. This section is not only for me as an individual researcher and evaluator, but for the like, through our work, can do something new that better our world and futures.

The researcher's embodied experiences and affectionate knowledge

In my case, in terms of thinking with "matters of concern" or using a realistic approach, I indeed embarked into "the wild" for my research on the effects of water-related CCAIs in two case-study communities, Nam Hung and Quoc Tuan. On one hand, my knowledge of farming practices was at the beginner level, and I came to know local livelihood realities through my own embodiment (see Chapter 4 for my research activities on the second field trip and my scholarly move or subjective shift). On the other hand, I still carried my professional instruments: official reports, photos, SLA-informed research questions, focus group meetings, individual interviews, the NVIVO software package, computers and literature reviews.

After engaging in this kind of "research in the wild", the new knowledge I gained on local livelihoods in relation to the effects of water-related CCAIs is embodied and collective, as well as affectionate. At some point, my knowledge is informed not only by my cerebral intentions and epistemology but also by a visceral form of knowing. There is no difference in the weighting of the knowledge gained through my taste buds and skin cells and that gained through SLA-informed research activities. I have become more sensitive and responsive to other involved actants in my project. My embodied knowledge of local livelihoods is formed by the sliminess of water on my skin, the nice fragrance of new rice, the sweetness of running water, the tastiness of vegetables cultivated using animal and human faeces for fertiliser. It is

also formed by my own embodied childhood memories and sympathy with my farming family. There are also my complicities as a government-employed scientist responsible for implementing CCAIs for local residents in Thai Binh province, or at the national level, for developing legal climate-change documents. This kind of knowledge is formed also by my passion and my desire to achieve something meaningful via my PhD project for my hometown, the one where I was born and grew up.

This embodied and affectionate knowledge with and for local communities, my hometown, farming practices and of course my PhD research puts me in a state of negotiation and trade-off between my strong personal desires, expectations, breakdowns and struggles. In this on-going negotiation and struggle, to form this embodied awakening into the fixed and linear narrative of an academic thesis. I felt pushed to choose between two options.

After two years of my PhD journey, the first option was to shape my thesis around critiques and recommendations in terms of both M&E practices and climate-change adaptation. I could mount a critique of the limits of "matters of fact" scholarship in the current mainstreaming of M&E practices, the limits of applying SLA for the exploration of water-related CCAIs, and especially, the failure of my proposed set of indicators. A solid critique of these practices is acceptable for a PhD thesis in the context of current prevailing approaches to M&E, whereby scientific practices, indicators, frameworks, and models are prevalently dominant and need to be challenged. These M&E practices do not present local realities as a complete state of affairs, and also have become another kind of development program crafting other realities that follow pre-deterministic objectives and the assumptions of outsiders or donors. They are not for the sake of local beneficiaries. The example of M&E practices applied in the World Bank project (see Chapter 3) has demonstrated these limits. This is a critique of a scientific and outside-imposed/neocolonial approach in M&E practices. With these kinds of findings my research outcomes could acknowledge and create space for the messy, dynamic, diverse, relational and multiple local livelihoods. I could also open up possibilities for further discussion of the role of theories of change or other scientific M&E practices within current M&E discourse. This kind of thesis can contribute to eliminating or at least putting the pause button on applying scientific M&E practices. This type of thesis would thus urges us– in particular officials, researchers and evaluators in relation to CCAIs–to seek alternative to M&E that can be non-scientific and go beyond the conventional bounded rationality (Chapter 3).

If following this option, my PhD project would also in many ways be objective, reliable, scientific and a valid critical realist description of already-existing local realities. However, my complicities, passion, desire and care did not favour this safe way for my PhD journey. There is something within me that is similar to the commitments and responsibilities of local farmers in their farming projects whereby they care for, with and by their fields, rice plants and other entities in their local communities. I thus became a non-neutral, caring subject, one who is more-than-rational, more-than-scientific, a more-than-researcher in my own PhD project. I have gone through not just collecting and analysing data and describing and critiquing local realities within standard social research methods. I became much more attentively, responsively and intensively engaged, even bodily so, with the local communities and my project's outcomes. I paid great attention and carried out much laborious work to fulfil the mentioned complicities, passion, desire and cares, as well as to create a good thesis. Like Mr Lich who cares too deeply for rice plants in his hamlets to let their fate be decided by rituals that are complex and hard to understand and apply, technological equipment and the scientific models of the young engineers, instead adapting his own methods. Like the elderly farmers who care deeply for their water, soil and rice plants in conditions of water scarcity and salt water intrusion. Like my participants, I cared too deeply about the outcomes of climate-change adaptation to leave my assessments only to "scientific", "developmentalist" or even "critical" models of classic monitoring and evaluation literature, with its indicatorist culture that cannot (or will not) pick up on the why and how of adaptation beyond the modelled theories of change.

If my research is not objective, but subjective, my role in the process of producing knowledge is not as a representative subject but as a non-neutral one. This means that my research outcomes are not intended to represent local embodied knowledges as another "documentary" on locality. So, what is the point then? Moreover, what, is the outcome of this kind of research?

Possibilities of doing our research differently

Some scholars, for example, Cameron et al. (2011) in their research on urban gardens under climate change, point out two main dispositions in doing research. They write

> If research is concerned with capturing and uncovering an already-existing external reality, then it has to meet the criteria of being objective and representative and reliable and valid.

> However, if research creates realities then our "criteria" are about the type of world our research is helping to create. […] [T]he critical questions include "what might be brought into being. … [and] what should be brought into being". … "How can our work open up possibilities? What kind of world do we want to participate in building? (Law and Urry, 2004, and Gibson-Graham, 2008, cited in Cameron, Manhood, and Pomfrett, 2011, p.497)

This quote seems to me to be fair-minded: one can follow either a realist attitude that makes attempts to represent already-existing reality as objectively, legitimately and professionally as possible, or a non-realist one (what I call here a realistic approach) whereby the researcher attends to the particular realities created through her/his research practices. Researchers or knowledge workers can choose to go with the former or the latter.

Chapter 3, however, argued that the realist approach based on "matters of fact" scholarship abstracts and over-simplifies realities and only can represent some parts of the whole reality, while in actuality, there are always social and material constructions in forming particular realities. This means that we somehow cannot meet the criteria of objectivity, and apoliticalness required by the realist stance. An independent evaluator cannot declare that his or her M&E projects' outcomes are free of value, totally objective and representative of the already-existing realities of his/her evaluands.

I do not mean that other research in relation to CCAIs and their M&E projects are not good or that they are inaccurate or ineffective, nor that researchers, officials, evaluators, practitioners and other stakeholders are not good enough. No doubt there are currently many ways to carry out research projects and their M&E practices within the context of Vietnamese climate-change adaptation. Government agencies, NGOs, scientists and other stakeholders all manage to work for better adaptation. However, it is certain that most of these kinds of current research and M&E projects are realist. They come to work and represent their outcomes for the sake of objectivity, legitimacy and professionality.

However, with my argument so far, we somehow cannot avoid the affective effects of our values, political dispositions, subjectivity, society and culture on our research, even on scientific projects such as ones in the Salk Laboratory in the work of Latour and Woolgar (1979). Bruno Latour in his recent interview fighting back against climate-change deniers, states that "[s]cience has never been immune to political bias. On issues [such as climate

change] with huge policy implications, you cannot produce unbiased data" (insert added, de Vrieze, 2017).

In the same way, current M&E projects are also contributing in creating other realities, whether intended or not (Latour, 2014), for example the M&E practices in the World Bank project on clean water and rural sanitation, discussed in Chapter 3, contributed to a culture of valuing public water supply over traditional water supplies, even if these were perfectly adequate for some needs. In addition, the pitfalls of current mainstream M&E practices (see Chapter 3) as well as the maladaptation of many CCAIs (see Chapter 2) are obvious and not new – we seem to know this already. The need for change seems clear for M&E practitioners, experts, me and perhaps my colleagues in Vietnam. But the question is, how can we do CCAIs and their M&E differently? How can we make these needed changes in practice, especially once we have critiqued the old ways?

My contention here is that our values, political dispositions, subjectivity, society, cultures, and other mundane sentiments always affect our practices as researchers and knowledge workers. We therefore should let these kinds of sentiments exist openly within our research, as they are there anyway! These can potentially forge and activate the emergences of new possibilities, solutions and other realities that we really want.

In my "experiment" of learning from locals with their embodied and affectionate knowledge, I had open, communicative and responsive conversations with my research *objects*–indeed lively things or involved actants. I understood my responsibilities for doing material work that follows "caring with" practices. These "caring with" practices are different to the attitude behind the implementation of water-related CCAIs mentioned in Chapter 1 and 2. These government CCAIs follow the mode of "caring for" locals. The government officials take over the burden of meeting locals' needs to adapt to climate change. This is similar to the way adults take care of their children and do not necessarily ask for consent, practice responsiveness or engage in a back-and-forth negotiation of what should be done. Nor is a "caring with" practice about "putting oneself in the shoes of others" to think and determine what are the right things to do for others (McKinnon, 2017). Rather it is being aware of "the withdrawal of the self, a passivity that enables an active listening, an opening to surprises" (Puig de la Bellacasa, 2017, p. 198). This attitude is not about "speeding up abundant outputs" (Puig de la Bellacasa, 2017, p. 191) but instead about slowing down and making time for the

material work of care for our research outcomes, other involved actants, and the process of back-and-forth negotiations.

In my case, I did not “speed up” for the original thesis objective: a set of indicators; rather I “withdrew” myself to create more time for thinking and negotiations. I made my subjectivity visible, particularly in narrating both methodologies I have used in my thesis structure rather than smoothing over my earlier attempts at developing indicators. I did not follow the conventional steps of a PhD student of setting up a hypothesis in her/his project, going to the field, collecting data, analysing and interpreting, and while writing up the thesis, revising the hypotheses and methods in order to get the findings to fit neatly into a framework. I saw myself as unashamedly accepting my breakdown and “stay[ing] with the trouble” (Dombroski, 2018; Haraway, 2016; Puig de la Bellacasa, 2017), welcoming the back-and-forth negotiations between a set of indicators and my own complicities, my desire for meaningful outcomes for the PhD project. I did not put the emphasis on how to care for locals by proposing things I thought would helpful for them; rather I embarked on “care with” practices with locals and other involved actants. I deliberately articulated my subjective propositions to create embodied and affectionate knowledge on the effects of water-related CCAIs. My critique on these effects then turned to “surprise” (Cameron, 2015) and to “delight” (Wright, 2017).

McKinnon (2017) calls this research stance “naked scholarship”. There was an exposure of my dispositions, subjectivity, religion, complicities, values, desires, concerns, cares, other mundane sentiments and even my personal life. This research attitude is totally different from the conventional one, whereby one comes to research and does what they need to do as an objective professional.

In engaging bodily with our research objects/actants, the relationships between researchers and the sites, localities, participants, all other involved actants including human and non-human, and our research outcomes become muddy and messy. I cannot distinguish whether “mucking in” (Wright, 2017) or “naked scholarship” (McKinnon, 2017) came to my M&E project first or whether my own embodied experiences and intense engagements led to acknowledging the embodied knowledges within the sites. However, within these kinds of relationships and connections with what we research and the involved actants, researchers can work collaboratively and collectively; they affect and are affected by others; they also more or less transform themselves. Researchers become non-neutral while the other involved

actants become co-experts. Researchers therefore do not discover knowledge from something separate and unconnected from themselves and the context; rather they orient themselves around particular shared concerns and then identify what is at stake, which in turn form the basis for further deliberative material work. From this our research can literally "matter", that is, contribute to make something.

6.4. Evaluator's embodied knowledge and doing monitoring and evaluation differently

I now turn to explore how attending to the embodied knowledge of evaluators can support them to do M&E differently, which then in turn supports doing climate change adaptation differently.

Chapter 3 pointed out the social and material constructions in the process of generating M&E results. This means that as human beings there are no evaluators in ivory towers doing M&E projects using *pure* practices; rather they always use *impure* ones (Schwandt, 2003). There is no monitoring and evaluation that is value-free, particularly via indicatorism (Dahler-Larsen, 2014; Moed, 2018). As discussed in Chapter 3, the current M&E practices following thinking with "matters of fact" just lead to us as evaluators being side-tracked by accuracy, legitimacy, and so on. I reiterate: how do we move into an M&E project or research informing our matters of shared concern and matters of care that inform much-needed change?

One space where this question is being negotiated is online, in a blog[42] whereby many elite and senior evaluators, including theorists and practitioners, offer recommendations and advice for young and emerging evaluators (YEEs) (Ofir, 2018b). This is an up-to-date forum on effective M&E. In particular they can offer "top tips" to young evaluators ultimately aiming to fulfil the M&E promise of supporting others in building better societies and caring for ecosystems and the planet. As may be expected, these top tips are diverse, multiple and varying. They include evaluation standards, principles, competencies, theories and practices, methodological alternatives and skills in communicating and facilitating (Ofir, 2018b). YEEs are now required to equip themselves with not only the logics of thinking but also with other

[42] Blog developed by Zenda Ofir entitled: *Evaluation for Development: A Focus on the Global South*. Sources: http://zendaofir.com/zendas-top-ten-tips-for-yees-1/ 2018.

critical thinking. Examples of the language used in these recommendations include “methods should not drive evaluations”, “cultivate diverse interests”, “think beyond individual interventions and our objectives”, “think about our interconnected world, and implore others to do the same”, “be mindful and explicit about what frames and shapes your evaluative judgments”, “mind the question ‘whose knowledge’ matters!”, “develop the skills required to do a strategic design for an evaluation of an ecosystem management program”, “building ecosystem stewardship into your evaluation practice”, “encompass values, policies, laws and institutions that determine how ecosystems are conserved and used”, and “care” (commented by many knowledgable evaluation theorists and practitioners on the blog of Ofir, 2018b). Such recommendations encourage YEEs doing M&E to engage with and come closer to evaluands, and to embrace the differences and multiple facets of realities.

Michael Quinn Patton, the well-known M&E theorist mentioned the thesis’s introduction, distils all these requirements into a fundamental recommendation: *to “steep ourselves in the classics”* (Patton, 2018c). What Patton means by the classics here forms a substantial part of his idea of *evaluation science.* He writes:

> Evaluation science involves systematic inquiry into the merit, worth, utility, and significance of whatever is being evaluated by adhering to scientific norms that include employing logic, using transparent methods, subjecting findings to review, and providing evidence and explicit rationales to support reason-based interpretation, valuing, and judgment. (Patton, 2018a, p. 187)

This passage is part of a section published by the American Evaluation Association, the largest organisation in the world focused on evaluation (both in terms of theory and practice development). Reading carefully through this passage, we could propose that evaluation science (not *evaluation* as a noun) does not only focus on logics, transparent methods and scientific norms; it also requires rationales, which implies other beliefs and reasoning that do not belong to rational and scientific thinking or cerebral knowledge. Patton (2018a, 2018b) clearly states that the systematic inquiry and rigorous thinking of evaluation sciences do not reside narrowly in scientific methods.

Similarly, Schwandt (2017) is concerned about “an increasingly technocratic and tool kit approach to evaluation that diminishes the critical voice of evaluation… and exacerbates the depoliticalization of political decision-making” (p.549). The sense of “diminishes the critical

voice of evaluation and exacerbates the depoliticalization of political decision-making" recalls the fundamental problems of current mainstream M&E practices I identified earlier. There is a process of discrediting, marginalisation and deletion of social and material constructions in most M&E outcomes, and therefore a need for recovering forms of political decision-making in M&E thinking and practices. Political dispositions, values, cultures and other sentiments of evaluators need to be considered in the process of producing M&E outcomes or M&E knowledge on particular evaluands. There is a need for an inclusive stance in doing evaluation, one that takes into account "dialogue[s] involving argumentative interaction between the evaluator and stakeholders" (Patton, 2018b, p. 13). Schwandt (2002) terms this mode of M&E thinking as *value-committed*, then calls for the stance of democratic professionalism in doing evaluation. He describes democratic professionalism as follows:

> An evaluation ethos grounded in ideas of democratic professionalism and civic agency regards the production of evaluation knowledge as a "relational public craft" …, rather than as a detached, objective, expert undertaking commonly promoted by many evaluators. …The democratic professional… fosters a way of working together on co-owned, shared problems. … Democratic professionalism as manifest in evaluation does not assume an ideological, emancipatory commitment on the part of the evaluator or an a priori advocacy stance in favor of the particular ways of thinking and acting of some specific group of citizens or stakeholders. What it represents is a way of working with evaluative knowledge in everyday situations of debate and decision-making. (Schwandt, 2017, p. 551)

This passage shows a fundamental shift in current M&E thinking. This new thinking leads evaluators to go further and cross boundaries that have characterised the conventional evaluation profession (Chapter 3). "Co-owned", "shared problems", "work with", and "considering argumentative interactions" are all manifestations of a totally different way of approaching M&E. This mode of thinking encourages evaluators to gather around particular shared concerns with others (Gibson-Graham et al., 2019). This "democratic professionalism" is similar to the "democratic assembly" of Puig de la Bellacasa (2017) and the "parliament of things" of (Latour, 2004c, 2005). This mode of M&E thinking is not trying to be representative but rather to participate in open and experimental conversations where others gather and assemble around particular evaluands. It is indeed more-than-critical thinking, and follows the scholarship of "matters of concern" outlined in Chapter 4. However, it is not always easy for

YEEs to adopt this M&E stance, since many evaluators, scholars, and elite and senior experts within current M&E society do not do so.

Zenda Ofir, another knowledgeable M&E expert, mentions in her blog the limits of using the conventional evaluation criteria of the Development Assistance Committee (DAC)[43]:

> Everything we [presumably evaluators] do today should be framed by extreme and urgent concerns around the fact that our 'interventions' and their evaluation will not matter if humankind does not succeed in being less ignorant, greedy and uncaring about "the other" (Ofir, 2018b)

Kate McKegg, a member of the board directors of the Aotearoa New Zealand Evaluation Association, furthers this idea in a comment on Ofir's blog:

> Evaluation needs to also become more caring, more relational, more interested in counter narratives and practices, more concerned with the interconnectedness of things, etc.(Ofir, 2018b)
>
> She then bluntly recommends doing just that:
>
> [W]e have to transform ourselves; we have to do our own decolonisation and reconciliation with our past dominant narratives …And for those of us from white, privileged, colonising cultures, we have a LOT of work to do. Colonisation is not over, and it is not consensual– and we perpetuate it if we don't urgently address how, and in what ways our practice is complicit in its maintenance. (Ofir, 2018b)

All these kinds or aspirations and wills are the hopes and desires of these mentioned knowledgeable M&E theorists and practitioners towards more meaningful and significant M&E outcomes for better futures and worlds. The kinds of complicities and struggles mentioned are not only for the YEEs like me but also elite and knowledgeable evaluators and experts like Patton, Schwandt, Ofir and McKegg. However, these struggles are also manifest in our embracing of care in doing M&E. We do care about our M&E outcomes, the affective effects of these outcomes, and our M&E practices. The consensus for change is evident in the many tweets in the M&E community in response to Schwandt's speech on post-normal evaluation that is adopted from his work on democratic professionalism at the 2018 conference of the

[43] These criteria have been defined from the book on the DAC principles for its aid program, then be considered as the standards and norms for monitoring and evaluation since 1992. This includes Relevance, Effectiveness, Efficiency, Impact and Sustainability (OECD, 1992).

European Evaluation Society (see page 16) (Schwandt, 2018). Responding to the audience in terms of the ways to achieve so-called democratic professionalism or adding more caring, more relational, interconnected and interested practices when engaging in monitoring and evaluation, Schwandt refutes the idea of grand or massive changes for transformation; rather he stresses small experiments or experimental conversations amongst all actors including involving evaluators' subjectivities in the process of generating M&E outcomes or evaluation knowledge. The fundamental change needed is merely based on evaluators' modes of thinking and doing M&E in everyday life, which may be called *ethical* evaluation. This ethical point is not just about fidelity or work ethics as being unbiased and honest, and following normative standards. Rather it advocates for thinking and working with others in collaborative, collective, interactive, care-full ways. Alternatively, Tronto (2013) termed these practices "caring with", or it is framed by the scholarship of "matters of care" in the work of Puig de la Bellacasa (2017).

Putting this scholarship into more detail, Schwandt encourages evaluators to transform themselves into non-neutral and caring subjects, what might be called more-than-rational, more-than-scientific, a more-than-evaluator. Evaluators' subjectivities are required to evaluate in terms of values, politics, dispositions, and cultures (Schwandt, 2002). What Schwandt calls intimations for post-normal evaluation requires evaluators to expose their reflexivity (Schwandt, 2018). This intimation or calling is similar to the research stance of "mucking in" (Wright, 2017) or "naked scholarship" (McKinnon, 2017). Alternatively, Patton emphasises the value of immersing and saturating ourselves in order to be permeated with the *classics*, which are more than rigour scientific norms and rational thinking. This all indicates a broader sea change in scholarship in this critical moment in history.

In this environment, embodied knowledge can be considered as a potential starting point for evaluators to do M&E differently. Chapter 5 and the previous sections in this chapter have discussed and pointed out the relationality, collectiveness, collaboration, affection and more importantly action-oriented capacity for the material work of care from embodied knowledges. Embodied knowledges affirm intense engagement, the commitments and responsibilities of evaluators to themselves and to others in any particular evaluation context. These responsibilities ensure the kind of back-and-forth amongst all actants evident within the process of decision-making–in other words, democratic professionalism. This also can serve

as a starting point for evaluators doing M&E in decolonised ways that are different to current mainstream M&E practices.

In short, for the sustainability of our societies, ecosystems and planet, evaluators need to move their scholarship from “matters of fact” to “matters of care”. In doing so, using embodied knowledge for monitoring and evaluation, or embodied monitoring and evaluation, can be seen as an alternative to conventional M&E approaches. M&E thus is not only about accountability, effectiveness and efficiency, but also about creating possibilities or knowledge that increases possibilities for the evaluator to work with and for others, toward sustainability and transformation, particularly in a climate-changing context.

6.5. Conclusion: Adaptive responses for adapted worlds

In this conclusion, I argue that we must all adapt to uncertain and unpredictable contexts. There is a need for not only adaptation interventions but also adaptive responses for doing our work in terms of climate change adaptation. This is important because, with our embodied experiences and engagement, the embodied responses of local farmers, my responses as a researcher for her PhD project, and those response of evaluators, we can all join in different levels to enact power of others, and then together we work to create or contribute to create possibilities, and distribute those potentials toward adapted worlds.

This chapter thus first has argued that local embodied knowledge is collective, situated, affectionate and especially action-oriented and adaptive. Locals carry out their farming projects as professionals and lay-people involved in “research in the wild” where the core principle is to form collective bodies and work in close collaboration. They work with other actants following “caring-with practices” (Tronto, 2013) or “matters of care” scholarship (Puig de la Bellacasa, 2017). Their relationships with other actants are intersubjective, inter-being and inter-relational, farmers seek to encourage, nourish and work collaboratively and collectively with others to create possibilities. The critical point here is that, these farmers are not the ones who hold the power, at some points, and work over others, rather it is “power to” and “power with” other actants within their relational and generative networks (Allen, 2003) .This empowering “to” and “with” others is totally different with the “power over” of government-led interventions mentioned in chapter 1 and 2, or the dominance of scientific practices discussed in chapter 3. By bodily experimenting and engaging with other involved actants,

locals produce embodied and affectionate knowledges and become responsive, and more importantly, adaptive to changes in relation to their daily lives. Farmers then seek to do the material work of care for others within their farming projects: for example, the adaptation of elderly farmers for better public irrigation systems, Mrs. Tuat with her wish for a longer period for land preparation, Mrs. Hoi for more attentive farming plans, and Mr. Lich with his biological clock in controlling his sluice.

Learning from how locals produce their embodied knowledge for better and more appropriate adaptation, this chapter then proposed a productive starting point for a researcher and evaluator for working toward doing their work more adaptively and appropriately. This was an experiment I myself carried out as a researcher. Through my own embodied knowledge, indeed affectionate knowledge, I have acknowledged and been responsive to not only many local entities such as the feeling of sliminess on my skin, the nice fragrance of new rice, the sweetness of storm water and the tastiness of vegetables fertilised with animal and human faeces, but also my embodied childhood memories and sympathy with my farming family, my complicities, passion, desire, care for my hometown and even personal life. This also included my honest responses to the breakdown of robust indicators (mentioned in Chapter 4). These are my adaptive responses—a kind of self-realisation and re-subjectification of the researcher or "a politics of the subject" (Roelvink, 2015b). This is not about "build[ing] bigger walls, dim[ming] the lights, and pretend[ing] like no one is home when the stranger comes" (Gibson-Graham et al., 2019, p. 18). Rather, this re-subjectification along with "matters of care" calls for dispositions that "we are capable of making, and along the way we can attempt to solve problems, and engage with and nourish one another" (Gibson-Graham et al., 2019, p. 18) via our "care with" practices.

I, a researcher, have been adaptive and responsive against this breakdown as well the uncertainty and unpredictability of local realities in relation to water-related CCAIs. I even have been become what I called a non-neutral and caring subject, one who is more-than-rational, more-than-scientific, a more-than-researcher. I can "think multiplicity and see diversity" (Dombroski, 2016) or carry out "critical inquiry" (Hill, 2015). From this scholarly move and acknowledgement of my own embodied knowledge, my material work of care can be seen in my will to do this PhD project differently, the proposal of applying an embodied approach for

doing M&E differently, and the call for exposing our scholarships in doing research on climate-change adaptation.

Regarding to the politics of evaluators as subjects of their own M&E project, this chapter has shown how the M&E community tries for acknowledging diverse interests, being with interconnected worlds, explicating evaluative judgments, cares and so on. In starting to do M&E with embodied knowledge like the locals in their farming projects, evaluators can produce their own affectionate knowledge with "matters of care" or carry out any M&E projects with "care with practices"; they can follow decolonised ways that might not be dominated by scientific orientation and neoliberal methods (mentioned in Chapter 3). This is ethical evaluation whereby evaluators work collectively and collaboratively with their evaluands and other involved actants. They commit and respond to "what matters" for them and other involved actants. It is an adaptive response on the part of evaluators who want to contribute to building something new and meaningful from their M&E practices rather than just representing the effects of interventions as realities.

In the same way that farmers work on their farming project, the adaptive responses of myself, researchers and evaluators can be considered the acknowledgement of the politics of subjects in doing their work in terms of climate change adaptation and its M&E. Our affectionate knowledge and commitment to our work is reflected in our stance on working with others. The power of others was not previously accounted for in our work, either other actants such as non-human systems or our own subjectivities. The power of others and our subjectivities is thus acknowledged and encouraged.

My point is that these kinds of individual responses can make significant changes as we move forwards in our adapted world. This is because, we, farmers, researchers and even evaluators are anywhere. The ubiquity of us is similar to the presence of woman in second wave feminism, described in the work of JK Gibson-Graham as she accounts for the development and growth of localized feminist politics up to the global levels (Gibson-Graham, 2016). The potential possibilities such as the place-based adaptation of local farmers, the individual adaptive responses of mine, those of evaluators and researchers can be *"scaled out"* and distributed beyond its forming contexts. This "scaling out" is totally different with the sense of "scaling up" or rigidly replicating and hierarchically imposing management of government-led interventions (mentioned in the chapter 1 in terms of irrigation infrastructure

and farming techniques), or the scientific M&E practices and standard social methods. The adaptation interventions emerged from the processes of “scaling out” are adaptive to the contexts they find themselves; and more importantly the ideas of these interventions can travel and thrive.

Embodied knowledges start within individual human bodies. They do not come from grand narratives and a modernist form of epistemic knowing. However, this does not mean that embodied knowledges remain within the narrow territory of individual bodies or local communities in terms of spatiality and temporality. The collective bodies, caring relationalities, interconnectedness and inter-being are at much wider scales. This is about the politics, society, culture and religion that connect people, places, societies, histories and spirits regardless of temporal and spatial scales, as in the teaching of Thầy Thich Nhat Hanh in his example of paper that gathers and assembles clouds, rain, forests, people, soil, wind and so on (Thich Huyen Quang & Thich Nhat Hanh, 2015; Thich Nhat Hanh, 2009). Using embodied knowledge therefore considers an even broader and wider range of participants involved in any research or M&E project. This is not only about relationships between researchers and evaluators and other beings as human participants. Embodied knowledges imply all other actants including human and non-human entities involved in any of our work.

To some, the embodied approach may seem romantic. However, embodied knowledge is a practical form of knowledge that can act as a starting point for us to attentively engage with what we study, whether doing research in CCA or the M&E of CCAIs. Because human bodies are endlessly different, as farmers, researchers, evaluators, governmental authorities, elders, females, males, and so on, we must not forget that our embodied engagements and experiences are affected by (and also affect) many other factors (indeed actants) such as geographical conditions, societies, political interests, cultures. From this critical point, researchers, officials, independent evaluators and NGO staff can take responsibility for themselves as lay professionals and maintain the back-and-forth processes with other involved actants within their research. The subjective approach, or what I have called the realistic approach, can create various possibilities, or at least contribute to create favourable conditions for potential possibilities with collective bodies and diverse starting points. Let us critically enquire and rethink on our own subject’s politics, following “naked scholarship”, or answer the call of Schwandt (2003) to put evaluators’ subjectivity back into

M&E. We can make *personal* change within ourselves as evaluators as well as researchers in our ways of doing M&E projects or research. O'Brien (2012) calls this kind of personal change "deliberative transformation" in response to global environmental change, "a psycho-social process involving the unleashing of human potential to commit, care and effect changes for a better life" (p. 4). If we researchers and evaluators can be like the local farmers in their farming, with their affectionate knowledge, bodily connection and intense engagement with others, I believe we, together with others including humans and non-humans forming broader collectives, will open up pathways toward our sustainable futures. This is how we should respond adaptively toward adapted worlds.

CONCLUSION

TOWARDS ACTIVIST RESEARCH

> Small actions and networks can be seen to have sweeping global effects, and rapid large-scale change can emerge from diffuse local transformations. Theory has taken on a new relation to action—to understand the world is to change it. As a performative practice, academic research is activism; it participates in bringing new realities into being. Our role as academics has thus dramatically changed. We are less required to function as critics who excavate and assess what has already occurred, and more and more pushed to adopt the stance of experimental researchers, opening to what can be learned from what is happening on the ground. To put this in the form of a mandate, we are being called to read the potentially positive futures barely visible in the present order of things, and to imagine how to strengthen and move them along.
>
> —(Gibson-Graham & Roelvink, 2010, p. 342)

Introduction

Reflecting on our work as researchers plays a crucial role in navigating our ongoing behaviour and actions toward better worlds, especially in relation to climate change adaptation, where complexity, uncertainty and unpredictability are inevitable. What we know and how we know it is not neutral. As Gibson-Graham and Roelvink (2010) note above, “to understand the world *is* to change it” (emphasis added, p.342). The main goal of this research is to really get to know about the effects of our knowledge-making (M&E and research) work in climate change adaptation, and then from this knowledge to visualise potential possibilities for changing our failures and for working toward better adapted worlds. This study had two main aims. The first was to explore inclusively and thoroughly the effects of water-related CCAIs on local livelihood realities in Thai Binh. To pursue this aim, this thesis conveyed three experimental approaches: a postdevelopment perspective, the lens of science and technology studies and my own process of re-subjectification or self-critical reflexivity. Through these experimental approaches, considered as three distinctive layers of our knowing about local realities in relation to water-related CCAIs. These multiple knowing of local livelihood realities, , providing substantial support for achieving the second aim of this thesis, which was to produce actionable knowledges as ultimate research outcomes, beyond the “documentary” outcomes of conventional research.

Staring with the mainstream approach in working with the development program, I got to know local realities in relation to water-related CCAIs through the sustainable livelihoods approach (SLA). I then, went beyond this most recommended approach towards postdevelopment perspectives in knowing local livelihood realities. With the second experimental approach, the thesis critically studied how the way we get to know realities affects not just our understanding of these realities but in many ways the realities themselves. From understanding the limits of our current practices in knowing realities, I sought an appropriate scholarly move of transitioning myself from documenting to reflexively making and participating in forming new realities. This scholarly move was a mental journey from “matters of fact” to “matters of concern” and then “matters of care”. In all this, I have not only brought up multiple possibilities or appropriate adaptation but also opened up pathways so that we, as researchers, evaluators and knowledge workers, can create favourable conditions to turn other potential possibilities into being. The embodied approach to knowledge making has been

seen here as the potential possibility for better knowing the effect of water-related CCAIs. This approach has also brought about other practical forms of knowledges for better doing our climate change adaptation.

In this conclusion, I revisit the main findings and arguments of the six main chapters and the overall argument in progress through these chapters towards achieving these two aims of the thesis. I then discuss the various contributions of the thesis and its specific significance in terms of its theoretical, methodological and practical implications, for the end after which this conclusion is titled: *towards activist research*.

Summary of my argument

I set out six specific research questions which were addressed in the main six chapters of the thesis. Through the answering of these six questions, the thesis interpreted local realities in three distinctive layers of knowing; the overall critical arguments were also laid out progressively.

The first research question aimed at understanding the contextual background that sets the stage for all arguments following in the thesis. Chapter 1 thus responded to the question: How does Thai Binh province support its people to adapt to climate change in terms of water-related issues? I first began by exposing how the geography, climate, social characteristics and economy of Thai Binh form and influence local lives, particularly rice production, the most important local source of livelihoods. Key information on water-related issues and relevant interventions was also given. In this common knowing on developmentalist programmes like current water-related CCAIs in Thai Binh, I argue that to deal with the uncertainty and complexity of climate change impacts, Thai Binh government follows a long tradition of water management interventions that are technocratic and rationalist in approach. Both the irrigation infrastructures and the hierarchical administrative scheme and other regulations are trying to manage and control water for rationalist development logic. They are outside-imposed interventions, and they rely on predictability and rationality, for example the predictability of the seasons such as tides, long-term precipitation forecasts and hydraulic patterns, which are all compulsory input for irrigation plans, as well as the operation of upper stream dams, cultivation calendars and other governmental regulations. Shedding light on this management culture in doing climate change adaptation, Chapter 1 provided a glimpse of the

failures and maladaptations of these water-related CCAIs. The main issue is an overreliance on predictability given that climate change and the effects of CCAIs are uncertain and unpredictable.

To be able to know properly what is happening on the ground in order to open up alternatives to current interventionalist adaptation, Chapter 2 addressed the second research question: How are water-related CCAIs enacted on the ground? And, do their effects make a difference for locals in the province of Thai Binh? This chapter first applied the Sustainable Livelihoods Approach (SLA), a mainstream approach, with recommendations and amendments to capture the mess of this development work. The interpretation of the effects of water-related CCAIs included benefits (e.g., improvement in irrigation systems, increase in local incomes, decrease in agricultural costs, decreased farming time and labour work, decreased pest epidemics), maladaptations (e.g., saltwater intrusion, water scarcity, less silty water, unequal agriculture services) and other influencing factors and actors (e.g., institutional management, local identity, the local official's responsibilities in water management, land attachment, internal trade-offs within local individuals). I also argued that current government-led CCAIs merely bring short-term and intermediate benefits for local farmers. The government of Thai Binh knew little about the uncertain impacts of climate change or the effects of related CCAIs. The degree of uncertainty and unpredictability were still unknowable despite this logical, analytical and comprehensive approach; indeed it fails us. This chapter has answered directly that the Thai Binh government has not definitely been doing the right things and doing things right in supporting its inhabitants to adaptation to climate change.

In search of an alternative, chapter 2 then took the postdevelopment perspective into account by going beyond mechanistic application of the SLA in knowing local realities in relation to CCAIs. Building on postdevelopment critiques, the remediable or viable alternative can be found within and between the mess of development programmes. There is a need for taking uncertainty and unpredictability into account in the emergence of alternatives to our practices for knowing in relation to developmentalist water-related CCAIs. And, these government-led interventions are not the only resort, other positive futures for climate change adaptation are available, even within the mess of developmental CCAIs. There is a need of scrutinizing our practices and scholarships within development discourse including doing our work either climate change adaptation or M&E. This scrutinization is considered as starting

points to find alternative or pathways that support us doing something really differently, from within and between our current mainstream practices.

Chapter 3 addressed the third question: In what ways do our M&E practices affect our M&E results for water-related CCAIs? In particular, to explore how current M&E practices in representing the effects of interventions under uncertain and unpredictable conditions, I followed the steps of STS scholars, particularly Bruno Latour and his colleagues, who explore how scientific and social practices form scientific facts**.** Through the lens of an anthropologist, I argued that the dominance of the scientific fact-making orientation in doing M&E caused fundamental problems in representing realities: monitoring and evaluating to predetermined criteria more or less amplify, perform and even establish the very realities that they are meant to neutrally monitor and evaluate. I argued that M&E results represent just some parts of the whole realities happening on the ground. The realities of climate change impacts and the effects of CCAIs are missed, despite our scientific efforts, under the call of realism, to get to know them. It is impossible to get to know them accurately and represent what *really* happens. Since we cannot know and represent reality fully, the ultimate goal of our knowing is to have better and more appropriate climate change adaptation rather than better and more accurate representation of facts in and of themselves. There is thus a need to rethink and shift away from our current scholarship based on detailing ever more accurate "matters of fact", what I have called the *realist* approach. What is more important is to satisfactorily know the effects of CCAIs to the degree needed to find adaptive and actionable pathways in an uncertain and unpredictable world. I called this a *realistic* approach, one that seeks to stop being utopically and myopically reliant on conventional scientific practices for knowing the effects of CCAIs, to instead imagine differently for the emerging of potential possibilities, and deliberately participate to create possibilities for doing M&E differently.

Chapter 4 thus sought to explore this realistic approach to find pathways towards doing thing differently. This in fact answers the fourth research question: What is an alternative *to* M&E (indeed, a doing of M&E differently) for knowing the effects of water-related CCAIs? I further argued that such a realistic approach in doing our work as researchers and evaluators enables us to see the potential possibilities even in uncertain and unpredictable contexts. Instead of arguing about whether M&E results are scientific and empirical enough, as some might do when they seek to uncover "matters of fact", thinking with "matters of concern" we

consider the gathering of involved things informing M&E results, including lively nonhuman actants as well as locals and evaluators. This chapter argued that these lively actants are perpetually in ongoing and open conversations to shape M&E results. More importantly, these conversations include the unexpected outcomes and hoped-for outcomes, our affects and expected effects. In thinking with “matters of concern”, reality is multiple, ongoing and to some degree is the outcome of our work, and there is more than one reality, pluriverse rather than universal. This led to again confirming the value of a realistic approach as opposed to a realist one, where we, as evaluators and researchers, are always joining in to form particular realities, whether we mean to or not—hence we must pay attention to how this happens. The concept of articulating “matters of concern” also helps us to adopt multiple perspectives and unveil and then utilise the collective and collaborative associations of lively actants supporting us in dealing flexibly with the uncertainty and unpredictability of the effects of CCAIs.

In order to attempt further guidance on how we might embark on this alternative or “realistic” thinking, I examined lessons learnt from some scholars who succeeded in basing their projects on “matters of concern”, which in turn encouraged me to be candid in my own narrative of exploring the effects of water-related CCAIs through my own embodied experiences and engagement. My embodiment opened me up to other effects of water-related CCAIs in the province of Thai Binh, including the sliminess and stickiness of ground water in the dry seasons, the tastiness of fresh rice, local cultures, personal joys, local rituals and so on—things not often captured in our classic M&E attempts. This was an inclusive and constructive way of knowing how locals make sense of the effects of water-related CCAIs, knowledge which then informs their farming activities appropriately. I thus theoretically conveyed an embodied approach as the second wave of methodology for the thesis. This approach has been also considered as the alternative that enables us to see multiply or read the latent possibilities for better M&E practice, and then better CCAIs in general.

By experimenting with the embodied approach, Chapter 5 specifically addressed the fifth research question: What do we know about local realities in relation to the effects of water-related CCAIs through that alternative? Via local embodiment, I came to know other local livelihood realities that I could not know via the SLA. This knowing was significant, realistic and meaning-laden. I listened carefully to local oral responses for their thinking, feelings, thoughts, concerns and other emotions in relation to specific phenomena such as floods, pest

epidemics, plant diseases, water, rice plants and soil. It became clear to me that the relationships and conversations between locals and other involved (nonhuman) actants are two-way and inter-being. I argued that affect (formed by local sentiments) within inter-being relationships played an important role in how locals in Thai Binh adapt to the environmental changes emerging from climate change and relevant interventions. I discussed the processes of how locals become adaptive and responsive to all changes of other involved actants through their own embodiment, which in turn fuelled their appropriate adaptations, such as cultivating rice on river banks, erecting wire mesh around fish ponds or keeping private cement boats in case of serious flooding. It also exposed local intentions for ongoing adaptation for unknowable futures.

We started this thesis with the large-scale, technocratic and top-down water-related CCAIs that Thai Binh has applied and will probably continue to apply to support its inhabitants. By the closing of this thesis, we again returned to more appropriate adaptation for local inhabitants and as well as climate change adaptation in general. Chapter 6 thus answered the sixth question: What then should researchers and evaluators do to put the needed changes (the research findings) into practice? In contrast to what was interpreted in Chapter 1, Chapter 6 emphasised the starting point of the individual bodies of locals, researchers or evaluators in doing their work—a bottom-up rather than top-down adaptation. By examining the processes whereby locals formed their appropriate adaptation through two concepts—"research in the wild" and "matters of care"—I concluded that locals worked attentively, affectively, effectively and bodily with involved actants in their farming projects, from which they produced their useful embodied knowledges that are situated, specific and, more importantly, affectionate. With these embodied knowledges, local addresses changes in the surrounding environment or in their embodiment were responsive and adaptive. This significantly supported them to form appropriate adaptations. Learning from local farmers, this chapter drew conceptual guides for both researchers and evaluators in relation to climate change adaptation. Researchers and evaluators were called to become more-than-critical, more-than-scientists, more-than-researchers and more-than-evaluators. This chapter encouraged researchers and evaluators to "muck in" with the messy complexity of their research objects, evaluands and other involved actants; to likewise expose their scholarships; to inquire critically, see diversely and think multiply; and, most importantly, to work collaboratively and with care for and with others to

form more appropriate adaptation around our shared concerns in turbulent and climate-changing worlds.

My argument, therefore, is one that is based not just on analysing data and creating an adequate thesis to explain it. It is an argument that is deeply subjective while also being relevant beyond myself, as individual. It is an argument that makes a contribution in a number of different areas, which I will outline next.

Research contributions

Through carrying out this research with an experimental, subjective and realistic attitude, I contribute to relevant knowledges in several distinct ways. The three sections below list my specific contributions under three main themes: theoretical, methodological and practical.

Theoretical contributions

Monitoring and evaluation theories and practices

The first original contribution of the thesis is for M&E theory and practice. After fleshing out the common pitfalls of current M&E theories and practices dominated by a scientific orientation, Chapter 6 pointed out some current conversations whereby international M&E practitioners are discussing how M&E can be done differently. However, the details of this kind of evaluation, done without scientific and theory-driven methods, are still underdeveloped. This thesis has developed an embodied M&E approach as an alternative to M&E, thus providing much fresh knowledge to the field. This embodied approach is totally different to current mainstream M&E approaches. It goes beyond a strict scientific orientation and associated attempts at being *objective*. It embraces the value of the visceral and the subjective. Through paying attention to their embodiment, evaluators can consider the role of politics, cultures, values, scholarships, emotion, affects and other mundane sentiments of themselves and others in producing M&E results (Chapter 6). Thus, the thesis contributes directly to the call of Thomas A. Schwandt, Michael Patton, Zenda Ofir, Kate McKegg and other leaders in the field of M&E who have asked us to add “what matters” to evaluators into the M&E process (see section 6.4). The thesis thus has stated clearly that evaluators’ subjectivities are needed to be considered for more meaningful M&E results. In other words,

doing M&E is not about attempting to be objective, rather than accepting and acknowledging *subjective* when it happens. The embodied approach also considers "what matters" for others, who include the more-than-human, since embodiment is always in connection with other entities in the surrounding environment: rice plants, soil, water, the river and so on. The thesis brings these others' experiences, values and perspectives into M&E results. The thesis thus furthers this conversation on doing M&E differently, particularly bringing in post-humanist ideas, which I will detail later on.

Postdevelopment projects

The second theoretical contribution of the thesis is an affirmation and manifestation of current debates in postdevelopment thinking, particularly in the potential for finding possibilities for development alternatives from within and between the mess of development work. Recent scholars such as McKinnon (2007, 2011), Escobar (2018), Gibson-Graham (2005), Hill (2015), Dombroski (2015), Cameron (2015) and Chambers (2017), among others, have argued that there are always possibilities for alternatives to development without an wholesale abandonment of current development work. I have criticised CCAIs as development programmes with many maladaptations, but I have also acknowledged the benefits for locals in specific ways (Chapter 2). The concept of "matters of concern" (in Chapter 4) clearly stated the need to respect and build on "matters of fact", the dominance scholarship in relation to development programme, or scientific M&E results in order to enrich our understanding of local livelihood realities. I have neither refused nor disputed scientific facts, nor did I state that facts resulting from scientific studies are failed or wrong. Rather I tested "matters of fact" (Chapter 2), but then also explored the effects of water-related CCAIs via an embodied approach (Chapter 5) for additional knowing about local livelihood realities, particularly those which are multiple, dynamic, elusive and generative and that perhaps cannot be captured by traditional M&E. The thesis thus has revealed local adaptations mentioned previously, some of which are alternatives that exist alongside regular adaptations such as irrigation facilities and governmental water management. The alternative to current developmentalist CCAIs are included planting rice plants on the river banks, using the high wire mesh for local fish ponds, keeping cement boats preparing actively to floods, and etc (chapter 5). I also proposed an alternative to M&E that researchers, evaluators and governmental officials can work "in between", since they cannot get out of developmentalist CCAIs and the top-down and

technocratic management culture anyway. The thesis thus contributes to this postdevelopment debate by offering not only specific alternatives to development-informed adaptations in Vietnam, but alo an embodied M&E approach that is a manifest alternative to current mainstream M&E practices. These alternatives are formed by imagining and practicing M&E differently.

Affirmative critique

To answer the sixth research question—what we should do with our knowledge as researchers and knowledge workers for more meaningful and significant outcomes—the research also contributes to a larger body of knowledge that attempts to critique with affirmation, what some might call affirmative critique (Dombroski & Do, 2019) or *life-affirming* critique (Alhojärvi & Sirviö, 2019).

Affirmative critique means to work toward materialising something that we want from our work, while ordinary critiques are found from the work of critically deconstructed social projects, which leads to strong recommendations to dismiss what the project has criticised. This thesis makes moves toward affirmative critiques in the sense of finding and affirming the things that are going right or that become more meaningful and appropriate. This kind of affirmative critique works toward response-ability from the failures, limits or devastation of what we found from our research (Alhojärvi & Sirviö, 2019).

In particular, the thesis did not state that current water-related CCAIs have failed in supporting locals, nor did it suggest that the Vietnamese government should abandon them and then develop new interventions for better outcomes, as one ordinary critique might suggest. Instead it located potential possibilities from these maladaptations and limits and then affirmed or created favourable conditions for these possibilities to come into being. This thesis contributes to this kind of affirmative critique by not turning away in resentment upon encountering the maladaptations and limits of these interventions. Similarly, as an example, local farmers do not turn away from their losses to the serious plant disease epidemic of the Southern rice black-streaked dwarf virus. Rather, they react by seeking better ongoing adaptations by attentively deconstructing their farming behaviours during the epidemic (see section 5.4 in Chapter 5). Learning from locals, this thesis recommended that evaluators and researchers do their work with a “mucking-in stance”, a kind of “naked scholarship” with

“research in the wild” incorporating “caring with” practices, which supports them in becoming responsive and adaptive to their own struggles, helplessness and devastation that they themselves find in their work. With these kinds of self-criticall reflexivity, we can litterly contribute to the emergences of something.

In a recent paper I co-authored with Dombroski, I conveyed my own scholarly breakdown due to my complicity and disappointment, in order towards a kind of affirmative political ecology (Alhojärvi & Sirviö, 2019) via doing embodied monitoring and evaluation. We find the right thing to do in response to my failure and breakdown with respect to current scientific M&E practices, but not in the sense of refusing all these scientific practices (Dombroski & Do, 2019). Gibson et al. (2015) and Tsing (2015) would term the work for this kind of affirmative critique as cultivating the “arts of living on the damaged planet”. Alhojärvi and Sirviö (2019) call this affirmative critique a “seed” or the “creativeness of situated work”, which might produce something else: new possibilities for becoming and transforming in a climate-changing world.

Post-humanist projects

By emphasising embodied knowledge, the thesis has contributed to extending the theoretical conversations on post-humanist knowledge. I have drawn theoretically on the relationships among human and non-human entities by harnessing the work of Latour (2004a, 2004b, 2014), Puig de la Bellacasa (2017), Massumi (2002), Roelvink (2015b); Roelvink and Zolkos (2011, 2015) and Bennett (2010). The thesis has *decentred* the human locals within their farming projects by revealing and acknowledging many non-human actants working collectively and collaboratively for local appropriate adaptation. Two-way conversations and inter-being relationships between locals and other involved non-human actants indeed actually help characterise locals as human beings and shape their lives (see Chapter 5). In my own relationship with my hometown, post-humanist scholarship actually supported me significantly and thoroughly to explore the effects of water-related CCAIs on local livelihood realities. The sliminess and smell of groundwater in dry season, the sweetness of storm water, the different taste of vegetables grown applied with animal dung, the freshness of the first rice bowl in the local ritual—these nonhuman research participants have significantly contributed to form my knowledge on local livelihood realities (see Chapter 4).

In the same way, researchers and evaluators who want to work attentively and carefully with their research objects or evaluands (including non-human) might pay more attention to more-than-human worlds such as those of rice plants, rivers and the soil, amongst others (see Chapter 6). This research has also considered one of the key questions for us to be able to find "alternatives to development", asked by Robert Chambers quite some time ago: "Whose realities count?" In this thesis, the "who" here are not only the poor and marginalised people but also the non-human entities. The reality of the more-than-human world is clearly accounted for in this thesis, which may not be quite what Chambers meant at the time, but certainly fits the bill of challenging us to think beyond our development worker biases.

By advocating for embodied engagement and experiences with others including non-human systems, the thesis has explicitly recommended the potential approaches in working with other entities on our Earth. With this embodied approach in doing our work, our relationship with others of Earth has been shifted (see chapter 5 and 6). In this way the thesis has contributed to the provocative idea developed by Puig de la Bellacasa (2017) in her book subtitled *Speculative Ethics in More Than Human Worlds*. The arguments of the thesis has explicitly supported to form our speculative ethics in working with more-than-human worlds. We might not know in advance whether we will succeed or not. However, with embodied and attentive approach drawing on "matters of care" and the affectionate knowledge of others including non-human (see Chapter 6), in many ways, we will embark on post-humanist projects of adaptation which urge human beings to "come down from our high horse" and ensure equality between human beings and Earth Others (Gibson et al., 2015; Tsing, 2017).

Methodological contributions

This thesis makes important methodological contributions. Firstly, by critically paying attention to my own inability to develop a robust set of indicators, I have also drawn out the positive aspects of this breakdown moment, which was the tipping point for my affirmative research. Like Dombroski (2011) I contribute to embodied ethnography via paying attention to the awkward engagement with the sites (even the kind of surrender due to the constraint of, in her case, the maternal body). This is a significant contribution for researchers who carry out qualitative methods with hypotheses, since this sort of breakdown is quite common for research related to human behaviours, particularly at the grassroots levels. This original

contribution supports researchers to become responsive and adaptive to unexpected failures in doing their work.

Secondly, the embodied approach developed in Chapter 4 is not only a methodology for my own research and an alternative to M&E, as mentioned above. Applying human bodies as research instruments in exploring the relationship among human beings and the surrounding environment also makes an original contribution to the current debate on embodied methods for social science, particularly human geography (Hayes-Conroy, 2017; Longhurst et al., 2008; Wilbur & Gibbs, 2018). The thesis works as an example that performs theoretical insights that make bodies, affect and embodiment become more concrete methodological tools (Chadwick, 2017). With homestay activities, sensory interviewing of locals on their thoughts, feelings, concerns, hopes, emotions and other mundane sentiments, and my own embodied experiences and engagement with the sites, the thesis has explored a particular way that researchers and evaluators can carry out bodily their work in terms of qualitative research within human geography.

Last but not least, by being candid my own journey of moving from “matters of fact” to “matters of concern”, and then “matters of care”, the thesis is an experimentation of one who has gone through different approaches to scholarship in doing her research. The three experimental approaches including post-development, STSs and critical re-subjectification were experienced by myself in this order, as scholarly move. The critical arguments following postdevelopment perspectives shed light on my failure to develop a set of indicators, as per my initial research goal. It also led me to the following processes of applying STS and concepts of re-subjectification. However, in saying all this, I do not recommend that we all must necessarily experience such pain or failure By citing from and (Latour, 2004c, 2005, 2014), the thesis has highlighted the need for respecting and building on the results of thinking with “matters of fact”. In other words, the results from scientific and rational analysis are still important and not necessarily considered failures in our work. The researchers, evaluators and other knowledge workers might get to the state of thinking with “matters of concern” and “matters of care” without necessarily experiencing failure and pain resulting from “matters of fact”. However, I do hold that they value embodied and attentive approaches in doing our work, either for climate change adaptation or M&E.

Practical implications

As I have been writing these last few pages of my thesis, I visited my pre-PhD workplace. Like many PhD scholars, I found it quite a struggle to answer a question I kept getting from my managers and colleagues: what kind of practical contributions my thesis has for Vietnam. So here, near the end of the thesis, it is worth clarifying some of these practical contributions. In particular, the thesis expects to project specific ideas for government or international agencies and donors to take on board in doing CCAIs and M&E differently in Vietnam.

To press the "pause button" on imagining scientific utopia in doing M&E

By critiquing orthodox M&E practices, I have candidly pointed out the limits and pitfalls of scientific modes in doing M&E of CCAIs. Chapter 3 has particularly outlined the problems with scientific, outside-imposed and neo-colonial approaches in M&E practices. The contribution of these kinds of critiques thus can, at the very least, provide a reason to push the "pause button" or at least slow down the conventional thinking, which presumes the possibility of some kind of utopia via the scientific M&E practices of current M&E practitioners, NGO staff and government officials in Vietnam. If we pause, we might resist abstracting, defining, oversimplifying and representing only some parts of the whole state of affairs of local livelihood realities in the M&E results of CCAIs (see Chapter 3). We might be able and willing to welcome the M&E results that are not belonged to conventional practices, instead multiple, dynamic, uncertain and meaning-laden (see Chapter 5). Government officials, NGO staff and other relevant partners thus can gain meaningful and significant knowing on the effects of their CCAIs on the ground.

To stop thinking or preferring universal CCAIs

There is no doubt that CCAIs aiming for universality are strongly technocratic and emblematic of top-down management (Chapter 1 and Chapter 2). In other words, the culture in implementing CCAIs is "power over", rather than "power to" or "power with" (Allen, 2003). This thesis has highlighted the inappropriateness of this adaptation culture, and makes recommendations for it. There is a need of being suspicious to strict top-down management that not only limits and discourages local knowledge but also reduces the collective work for better water management for rice production in the context of climate change. For example,

in Chapter 2, I pointed out the unwillingness of local officials to listen to and work more collaboratively and cooperatively with local farmers, and also the fear that prevents local farmers from sharing their comments because of the strong bureaucratic manner of local officials. As a result, the thesis thus suggests that there is a need for flexible and collective policies and interventions that are less strict top-down and more bottom-up and democratic. Moving towards more bottom-up and democratic participation in climate change adaptation would reveal a wider range of perspectives in doing CCAIs. This can contribute to diverse adaptation by adding more options to the current common thinking. Adaptation does not have to be universal, and indeed, is unlikely to ever be. Thus, cultivating a variety of CCAIs that might be small and place-based and yet are entirely appropriate is important for global adaptation. For example, the local adaptations mentioned in Chapters 5 and 6 contribute to appropriate adaptation globally not because they are universal but because they are locally appropriate. This is not to say that we must suddenly cease implementing large-scale CCAIs or refuse current government-led CCAIs and only apply small and place-based adaptations, diverse and flexible adaptation might not necessarily be the whole answer. What I am arguing however, is that a culture of inclusive and attentive adaptation which works collaborative and collectively with many involved actants can find appropriate niches within specific, relational and generative contexts for appropriate interventions.

To have more appropriate opportunities to support locals

This thesis got to know the effects of water-related CCAIs differently, both intellectually (e.g., via the SLA and livelihood trajectories) and bodily (my own embodied experiences and engagement with the sites and those of locals). It has not only revealed the complexity and complicatedness of rice production and the water-related CCAIs applied; it has also revealed local thoughts, concerns, hopes and cares, and more importantly, the processes involved in forming ongoing adaptations. From this understanding, there would be more possibilities for officials, NGO staff and external experts to know when, where and how to intervene in the implementation's processes of particular CCAIs for more appropriate, significant and meaningful effects. Or they can know how to reveal the pathways as well as create favourable conditions for more possibilities of CCA toward more sustainable and perhaps transformative adaptation.

To rethink climate change adaptation interventions

Currently, scholars of climate change adaptation are debating from both conservative and transformative perspectives (see the thesis's Introduction). While the former is adapting as "business as usual", the latter is transforming to embrace new ways for economies, social relationships and even being human. However, these conversations still focus on how we as human beings can intervene for better situations. This thesis has extended these conversations by suggesting that climate change adaptation can also encompass instinctual behaviours and is constituted by many others, including non-humans. This suggestion focuses on the instinctual adaptation of many other involved actants. This means that climate change adaptation takes place not only via human intervention; there are many other kinds of adaptation coming from different entities. For example, Chapter 5 has pointed out the capacity of soil animal systems in composting the plant remnants without human intervention, which is somehow more appropriate than government-led interventions. There is thus a need to rethink our common perspectives in doing climate change adaptation in ways that automatically end up implying human intervention. This contribution might add to the conversations an alternative perspective that considers how other worlds, particularly the more-than-human, can work collectively and collaboratively with human beings rather than what human beings can do to support more-than-human worlds in adapting to climate change. From this contribution, more diverse adaptation options become available to us in our critical times under the climate change context.

To pay attention to performative effects

This thesis has performative effects for doing research and M&E in the work for climate change adaptation. The first category is the performative effects on locals whom I encountered with during my field trips. These effects emerged because in the opinion of farmers I was still some sort of expert. I came into the field to learn, and I respected and worked with locals and their knowledges. My practices, my values and my own projects thus have literally affected locals. The locals, my research participants, to some extent felt more confident and more proud of their own abilities to adapt to climate change and relevant CCAIs because a scholar was paying attention to them. This may influence their farming behaviours and livelihoods and even lead to more local place-based and appropriate adaptation.

Secondly, the thesis can affect young Vietnamese researchers and scientists in doing their work in relation to climate change adaptation. As mentioned on the Introduction of this thesis, we, young researchers, scientists or PhDs, have been participating and implementing government-led CCAIs in Vietnam. While in the Vietnamese context, CCAIs are followed through a technocratic and top-down management culture. In addition, these CCAIs are also influenced by many other factors and actors, such as political interest and arena, social relationships and kinship (see the thesis's Introduction). This means that developing and implementing government-led CCAIs is not always done for the sake of scientific facts or universality and consistence of administrative management. We, at a degree, have known and disagreed with this kind of culture. More importantly, many of these young scientists feel that their newfound expertise is unwanted when they attempt to apply what they learnt abroad in the Vietnamese context. They often feel somewhat disappointed and helpless in terms of their work making a difference or being meaningful for Vietnam. Many then end up seeking to emigrate to other countries, or else give up building their expertise and then follow the current *familiar patterns* that likely do not allow for the possibility of alternatives to climate change adaptation (Zink, 2013). My thesis contributes to this hidden debate and trade-off.

In addition, my personal positionalities, complicity and so-called *'naked'* scholarship (McKinnon, 2017), discussed in this thesis, share much in common with the personal backgrounds of these young scientists, whose subjectivities are 'colonised' by science and technology and the glamour of development. This means their ongoing attempts and contributions might be towards a scientific orientation and to follow the contemporary and familiar patterns of top-down development. At some point they might undermine or ignore locally appropriate CCA. Through the arguments and contributions mentioned above, I affirm the argument that in working collaboratively to care *for* and *with* others including locals and non-human, we can always produce meaningful and appropriate outcomes from our work, even if our research practices do not follow the familiar patterns or pre-determined governmental objectives. This to some extent can affect these young scientists, whereby they might rethink their intentions of doing something for CCA in Vietnam. This thesis has somehow utilised not only my intellectual but also my mundane thinking (indeed hidden and personal values and complicity) in doing our practices in climate change adaptation work. The process of my re-subjectification, self-critical reflexivity and scholarly move can work as a conceptual

and emotional guide for young Vietnamese scientists forward re-subjectification that might fulfil their desires for better climate change adaptation in Vietnam. This is another performative effect of the thesis, and this will provide a significant contribution for doing research, particularly in terms of climate change for Vietnam.

Final words from a new research activist

In many ways this thesis represents my own journey of experimentation for finding the appropriate solution for myself in order to be more adaptive and responsive to the uncertain worlds in which I found myself, as well as to open up conversations with other researchers and knowledge workers.

After nine years of wondering how and desiring to do something better and to be acknowledged by the ultimate beneficiaries (particularly local farmers), this is not the thesis that I set out to write from the first days of my PhD journey studying abroad. The results of this thesis might also not provide the ultimate answers with detailed practical application for CCAIs in Thai Binh, as some of my managers, colleagues and relatives might expect. I have not provided hands-on manuals or guides for officials, evaluators and researchers that support them to change their practices or approaches for more meaningful and significant results and outcomes. However, while not necessarily *practical*, the thesis is in many ways still *activist*.

With its experimental research approach, the thesis clearly makes a case for *doing our scholarship and evaluation work more thoughtfully, care-fully and affectionately* and unashamedly *adding our cares and concerns on what matters*, for us as knowledge workers, for our research participants, or for other involved actants, including more-than-human worlds. This thesis is thus a call of mine as an activist for doing something new or alternative to our climate change adaptation work and current M&E practices, particularly in Vietnam where we are seemingly overinvested in thinking and doing “business as usual”.

Let’s get back to the earth. Let’s muck in and get our hands dirty, attentively engage with what we study, expose our scholarships and values, accept our failures or breakdowns, and most importantly, work collectively and collaboratively with all involved actants. Like me, let’s try to work according to the title of this thesis, “Embodied Knowing for Climate Change Adaptation Interventions: Moving beyond Monitoring and Evaluation in Thai Binh, Vietnam”.

We can create “potentially positive futures”—we can always do it, and we have to do it—for our better worlds within our hometowns, our countries and our shared earth.

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ANNEXT - LIST OF PAPER AND PRESENTATIONS

- Dombroski, K., & Do, T. H. (2019). The affect of effect: Affirmative political ecologies in monitoring climate change adaptation interventions. *Nordia Geographical Publications, 47*(5), 7-20.

- Oral presentation “Climate change adaptation interventions for local community: Current monitoring and evaluation approaches” at the conference of the New Zealand Geographical Society at Otago University, New Zealand, February 4, 2016.

- Poster Presentation “Sustainable Livelihoods Framework and Water-related climate change adaptation interventions” at the Waterways Postgraduate Student Conference, Lincoln University, New Zealand, November 15, 2016.

- Oral Presentation “Sustainable Livelihoods Framework and Water-related climate change adaptation interventions in Vietnam” at the DevNet 2016 conference at Victoria University of Wellington, New Zealand, December 7, 2016.

- Oral presentation “Monitoring and evaluation of water-related climate change adaptation interventions (CCAIs) and local embodied knowledge”, seminar presentation at Department of Geography, University of Canterbury, October 6, 2017.

- Oral Presentation “The role of local embodied knowledge and monitoring and evaluation of climate change adaptation interventions in Thai Binh province, Vietnam” at the International Joint Conference on Evaluation of the Sustainable Development Goals: Transforming life through global and regional partnerships, with an emphasis on Latin America and Caribbean, University of Guanajuato, Mexico, December 8, 2017.

- Oral Presentation “The affect of effect: Using local embodied knowledge in monitoring and evaluation of climate change adaptation interventions” at the DevNet 2018 conference at University of Canterbury, New Zealand, December 6, 2018.